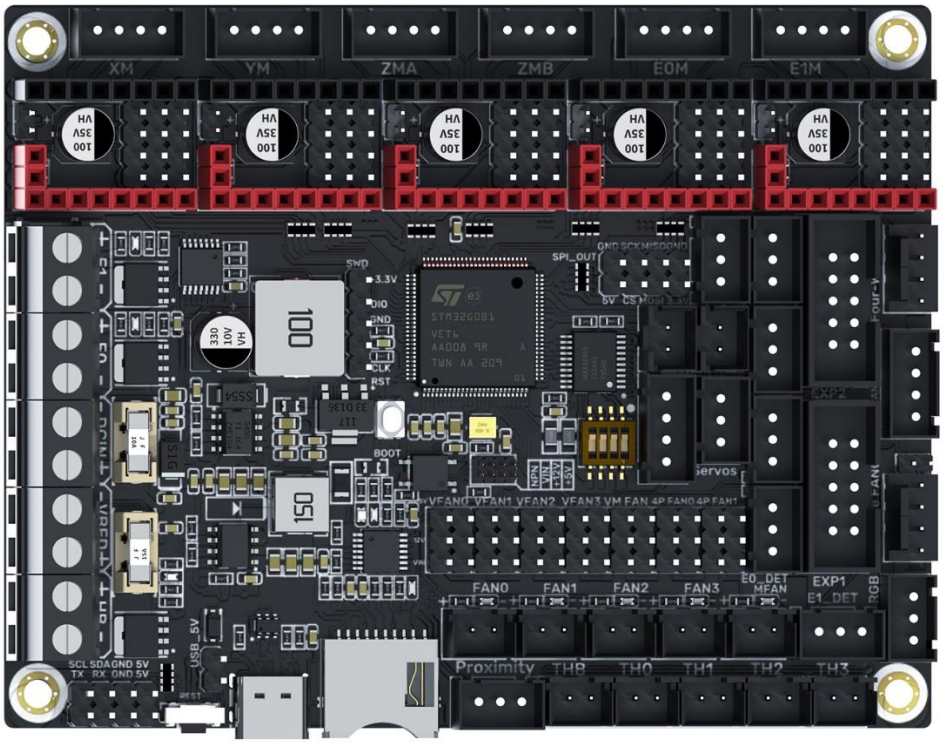
BIGTREETECH SKRat v1.0

User Manual



Contents

Revision History

Version	Note	Date
01.00	Original	2023/02/25

Product Profile

BIGTREETECH SKRat v1.0 is a 3D printer motherboard jointly launched by Shenzhen Big Tree Technology Co., Ltd. and Rat Rig.

Feature Highlights

- 32-bit 64 MHz ARM Cortex-M0+ series STM32G0B1VET6 MCU.
- Onboard BOOT button to enable DFU mode to update the bootloader.
- The thermistor circuit is protected to prevent MCU damage from shorted heated bed and heater cartridge connection.
- Four 2-pin fan ports, one always-on fan port, and two 4-pin fan ports.
- All fans can realize VIN, 12V, 5V voltage selection via jumpers, and different voltages can be set separately for different ports.
- Integrated SPI and UART mode of TMC driver and DIAG pin, easily configurable with jumpers.
- Supports power loss recovery, filament runout sensor, auto power-off, BLTouch, proximity switch, RGB, etc.
- Onboard non-spring loaded microSD card slot for upgrading and configuring firmware through microSD card, which is simple, convenient, and efficient.
- Onboard CAN bus port.
- The SPI expansion port is +3.3V and +5V selectable, which is convenient to connect expansion modules, such as an ADXL345 accelerometer.
- Onboard UART and I2C expansion output ports.

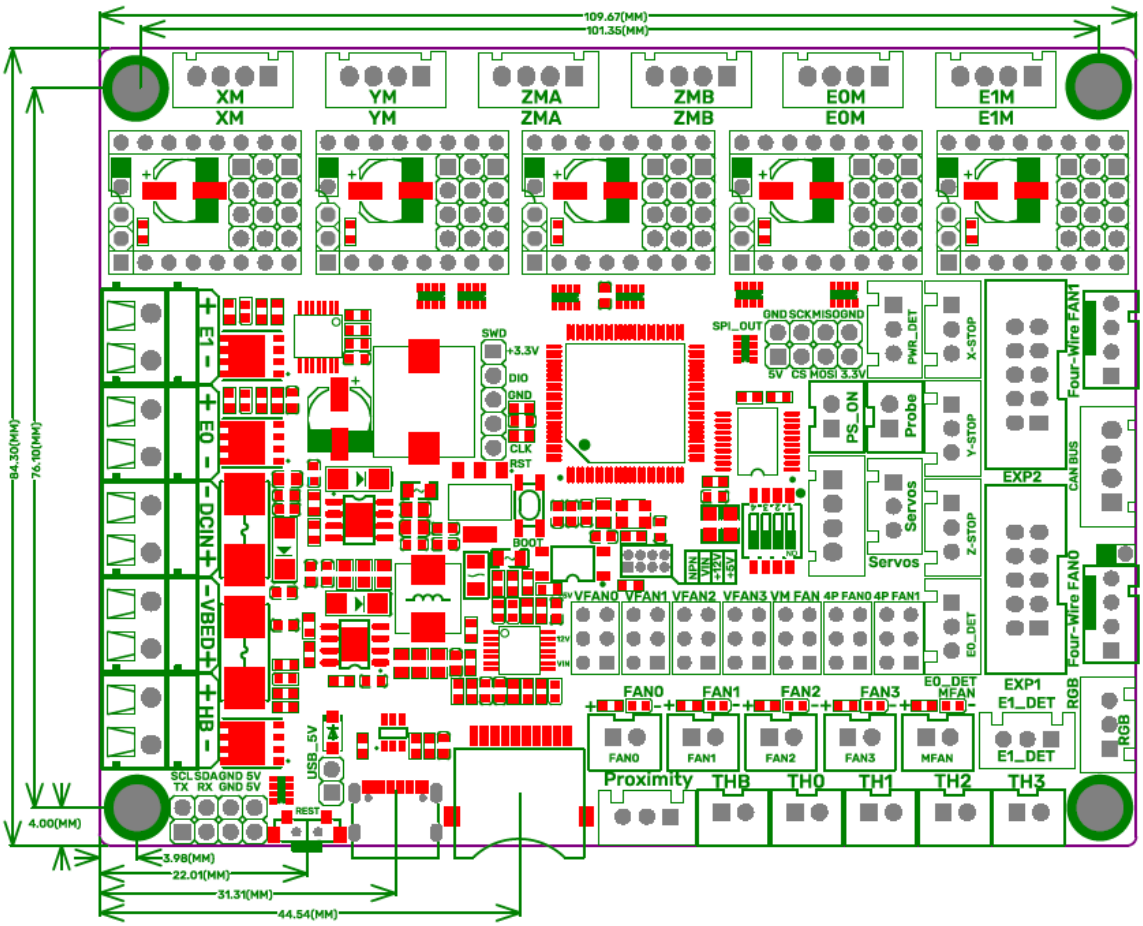
Specifications

Dimensions	110 x 85mm, for details please refer to **BTT SKRat_V1.0_SIZE**
Mounting Size	110 x 85mm
MCU	ARM Cortex-M0+ STM32G0B1VET6
Input Voltage	DC12V-DC24V
Logic Voltage	DC 3.3V
Heater Connection	Heated Bed (HB), Heater Cartridge (HE0, HE1)
HB Port Max. Current	10A Continuous, 15A Instantaneous
Heater Cartridge Max. Current	8A Continuous, 10A Instantaneous
Fan Port	4 x CNC, 1 x Always On, 2 x 4-pin Header
Fan Port Max. Current	1A Continuous, 1.5A Instantaneous
Overall Current (Heater Cartridge +Drivers+All Fans)	＜15A
Expansion Port	BLTouch (Servos, Probe), PS-ON, PWR-DET, Fil-DET, RGB, CAN-FD, SPI, UART, I2C
Stepper Driver Mode	SPI, UART, STEP/DIR
Stepper Motor Socket	X, Y, Z (Dual Z axes), E0, E1　5 channels in total
Thermistor	5 x NTC Ports, 1 x PT100/PT1000
Display	2.4-inch TFT, 3.5-inch TFT, LCD12864 Screen...
PC Connection	Type-C
Supported File Format	G-code
Recommended Slicer/Console	Cura, Simplify3D, Pronterface, Repetier-host, Makerware

Firmware

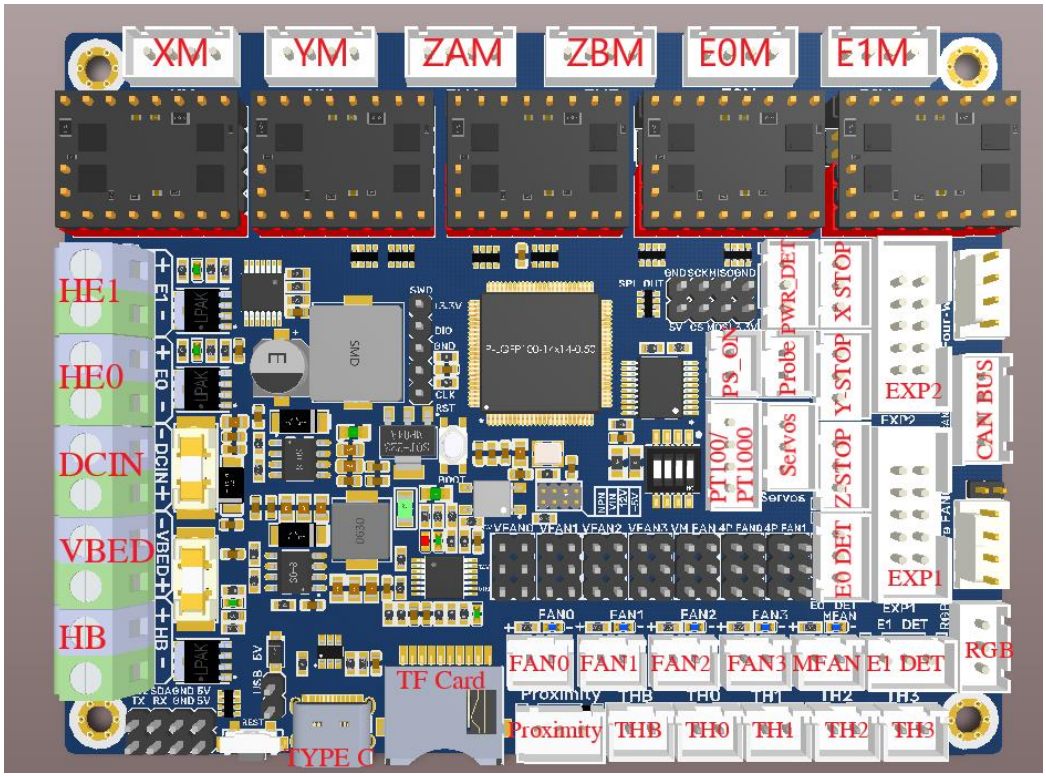
Supported Firmware: Marlin, Klipper

Dimensions

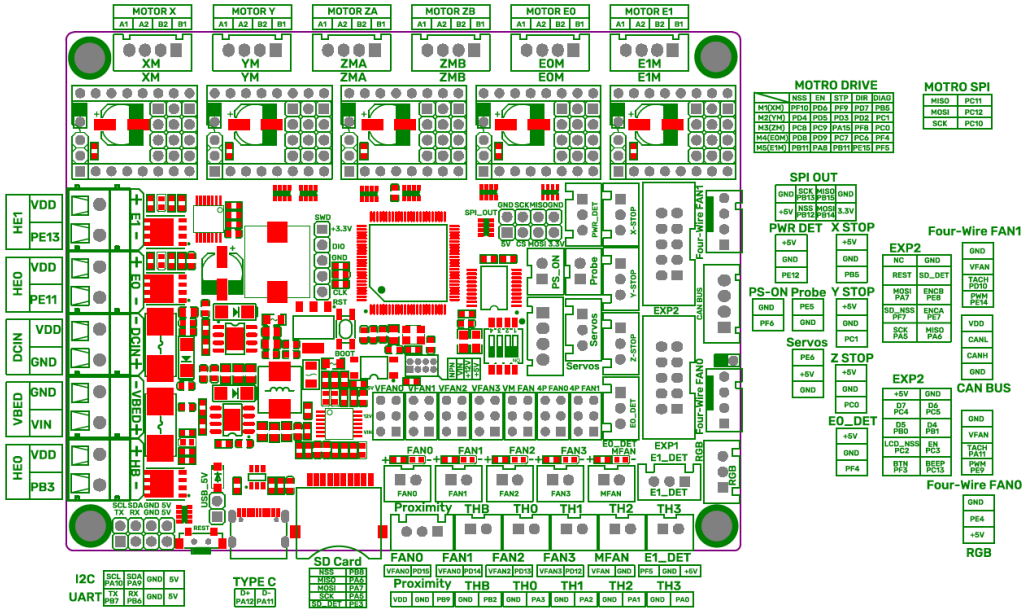

109.67(MM)
101.35(MM)
84.30(MM)
76.10(MM)
4.00(MM)
3.98(MM)
22.01(MM)
31.31(MM)
44.54(MM)
XM
YM
ZMA
ZMB
E0M
E1M
E1
E0
DCIN
VBED
HB
SWD
DIO
CLK
RST
BOOT
SPI_OUT
PWR_DET
X-STOP
Y-STOP
Z-STOP
PS_ON
Probe
Servos
EXP2
EXP1
E1_DET
E0_DET
MFAN
Four-Wire FAN1
Four-Wire FAN0
CAN BUS
RGB
FAN0
FAN1
FAN2
FAN3
Proximity
THB
TH0
TH1
TH2
TH3
USB_5V
REST

Peripheral Port

Connector Diagram



Pinout Diagram



For details please refer to BTT SKRat_V1.0_SIZE.

Function Introduction

LED Indicator Light

After the motherboard is powered on:

Power-Red Light-Power Indicator: The solid red light indicates normal motherboard power.

Status-Green Light-Status Indicator: When updating firmware, this light will flash and then be controlled by the firmware.

D10-Green Light-HB (Heated Bed) Status Indicator: The light will remain solid green when the heated bed is working and turn off when it is not.

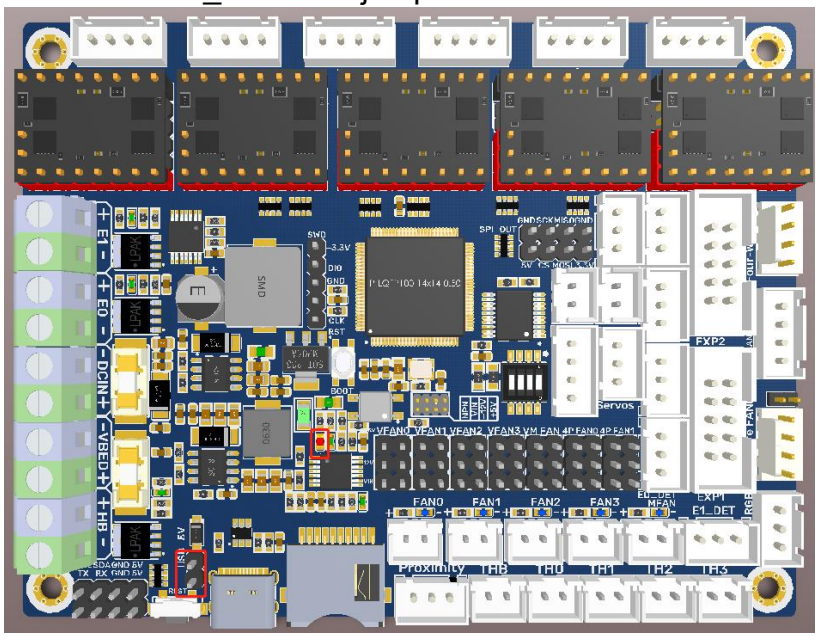
D3, D6-Green Light-E0, E1 (Heater Cartridge) Status Indicator: The light will remain solid green when the heater cartridge is working and turn off when it is not.

FAN0, FAN1, FAN2, FAN3-Blue Light-CNC Fan Status Indicators: The blue lights turn on when the corresponding CNC fan is running and turn off when the fan is off.

MFAN-Blue Light-MFAN Status Indicator: The blue light will remain on when the power supply is normal.

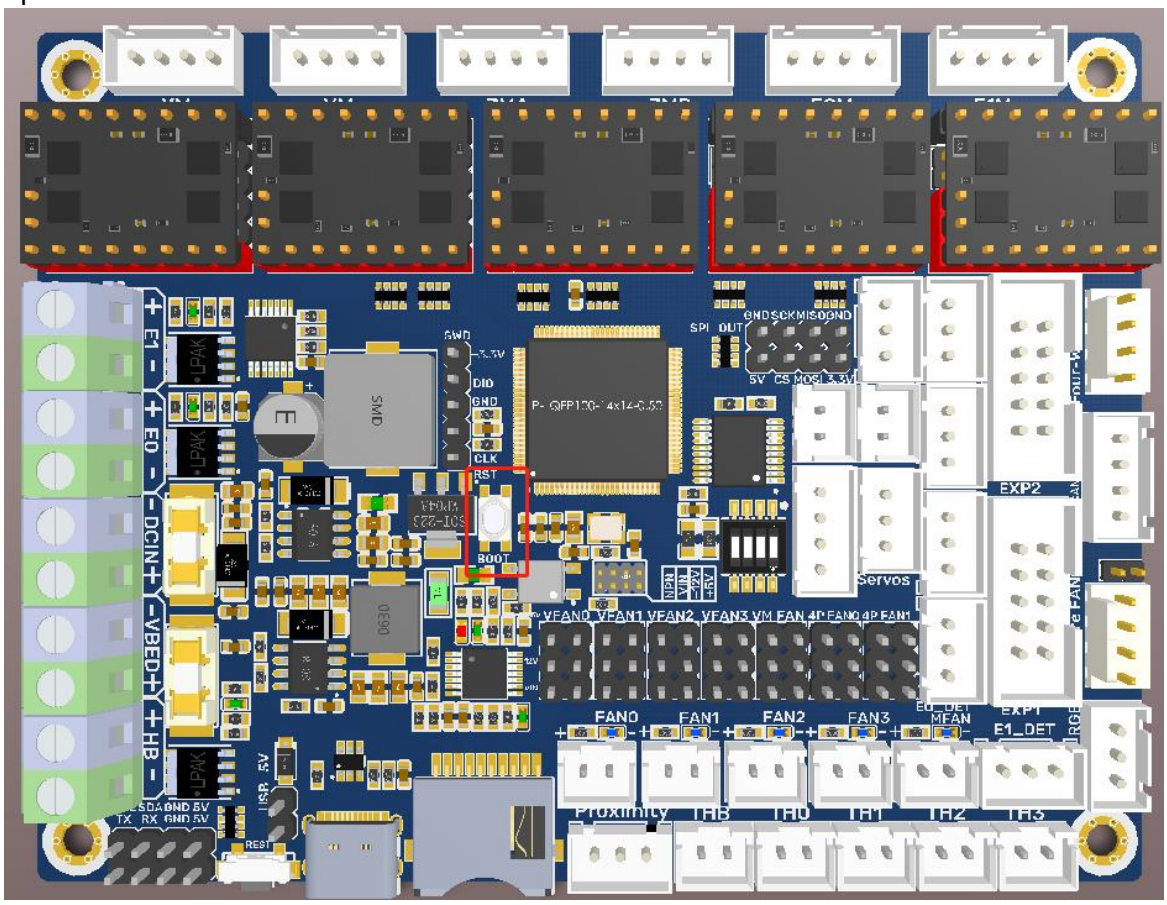
USB Power Supply

After the SKRat has been powered, the Power-Red Light on the middle of the board will light up, indicating power on. If using USB to power the board, please short the USB_5V with a jumper.



Downloading Firmware via DFU

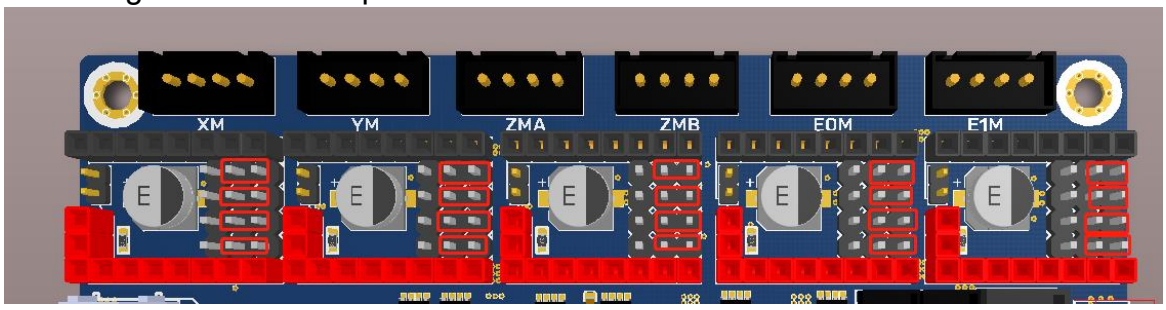
Press and hold the BOOT button, power on the motherboard, and the chip will enter the DFU mode. At this time, you can connect the board to the PC via the Type-C port, and update the firmware via DFU mode.



To Choose the Working Mode of the TMC Driver

STEP/DIR

e.g.: A4988, DRV8825, LV8729, ST820, etc., connect jumpers(MS0-MS2) according to the microstep table below.



Driver Chips	MS1	MS2	MS3	Microsteps	Excitation Mode
A4988 Max. 16 Microsteps 35V 2A	L	L	L	Full Step	2 Phase
	H	L	L	1/2	1-2 Phase
	L	H	L	1/4	W1-2 Phase
	H	H	L	1/8	2W1-2 Phase
	H	H	H	1/16	4W1-2 Phase
Current R_S=0.1Ω	$I_{TripMAX} = \frac{V_{REF}}{8 * R_S}$				

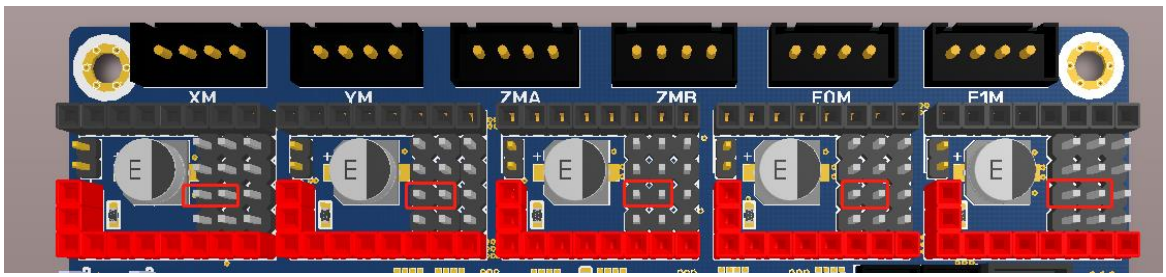
Driver Chips	MODE2	MODE1	MODE0	Microsteps	Excitation Mode
DRV8825 Max. 32 Microsteps 8.2V-45V 2.5A at 24V T=25℃	L	L	L	Full Step	2 Phase
	L	L	H	1/2	1-2 Phase
	L	H	L	1/4	W1-2 Phase
	L	H	H	1/8	
	H	L	L	1/16	
	H	L	H	1/32	
	H	H	L	1/32	
	H	H	H	1/32	
Current R_{ISENSE}=0.1Ω	$I_{CHOP} = \frac{V_{(xREF)}}{5 * R_{ISENSE}}$				

Driver Chips	MD3	MD2	MD1	Microsteps	Excitation Mode
LV8729 Max. 128 Microsteps 36V 1.8A	L	L	L	Full Step	2 Phase
	L	L	H	1/2	1-2 Phase
	L	H	L	1/4	W1-2 Phase
	L	H	H	1/8	2W1-2 Phase
	H	L	L	1/16	4W1-2 Phase
	H	L	H	1/32	8W1-2 Phase
	H	H	L	1/64	16W1-2 Phase
	H	H	H	1/128	32W1-2 Phase
Current RF1=0.22Ω	I_{OUT} = (V_{REF} / 5) / RF1				

Driver Chips	MS3	MS2	MS1	Microsteps
ST820 Max. 256 Microsteps 45V 1.5A	L	L	L	Full Step
	L	L	H	1/2
	L	H	L	1/4
	L	H	H	1/8
	H	L	L	1/16
	H	L	H	1/32
	H	H	L	1/128
	H	H	H	1/256
Current Rs=0.15Ω	$I_{peak} = \frac{V_{REF} * V_{DD}}{5 * R_S}$			

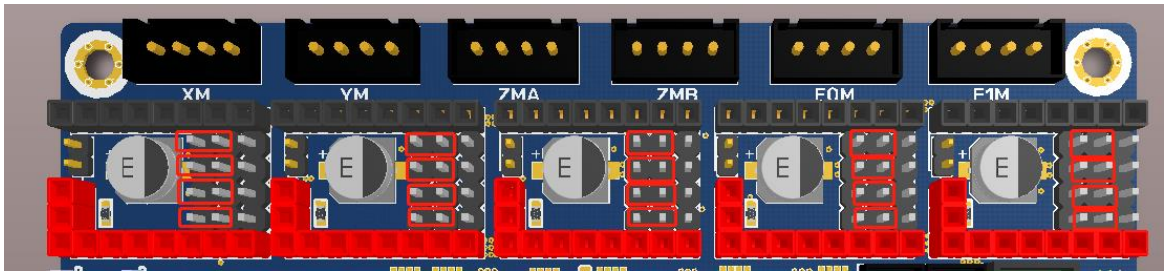
UART

e.g.: TMC2208, TMC2209, TMC2225, etc., place jumpers according to the diagram below, microstep and current can be configured in firmware.



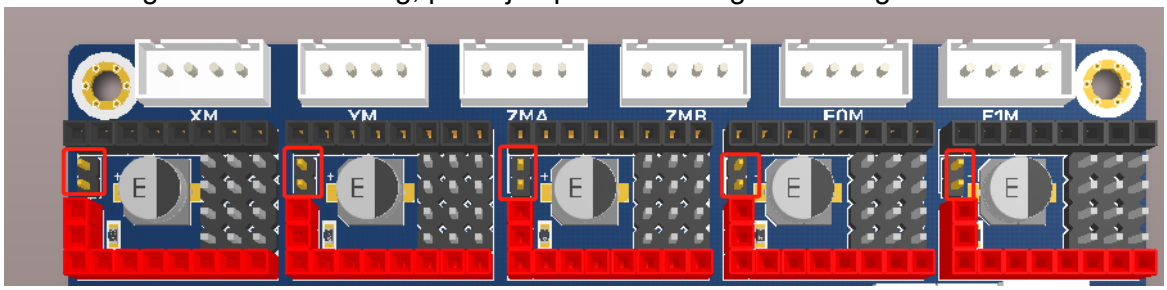
SPI

e.g.: TMC2130, TMC5160, TMC5161, etc., place jumpers according to the diagram below, microstep and current can be configured in firmware.



Sensorless Homing

When using sensorless homing, place jumpers according to the diagram below.

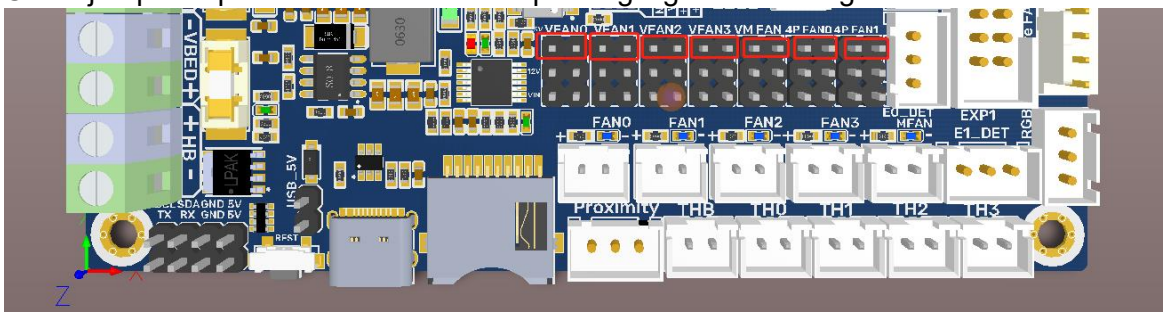


Note: The extra ENDSTOP cannot be used by selecting this function! ! !

Fan Voltage Selection

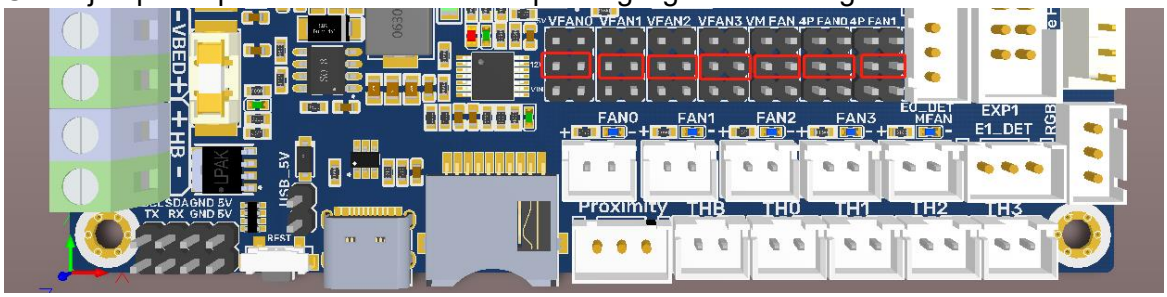
+5V

Use a jumper cap to short the horizontal pins highlighted in the figure below.



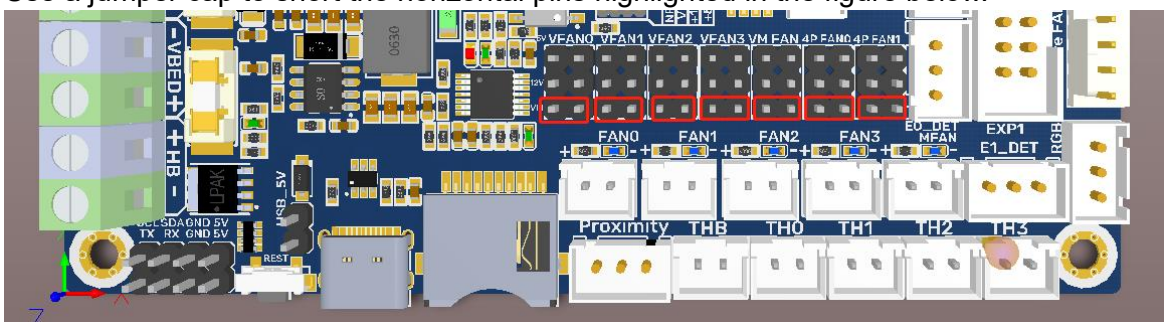
12V

Use a jumper cap to short the horizontal pins highlighted in the figure below.

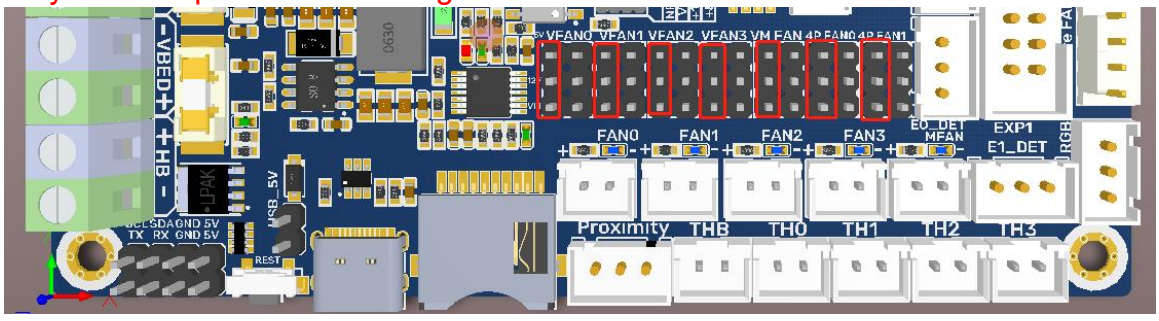


VIN

Use a jumper cap to short the horizontal pins highlighted in the figure below.

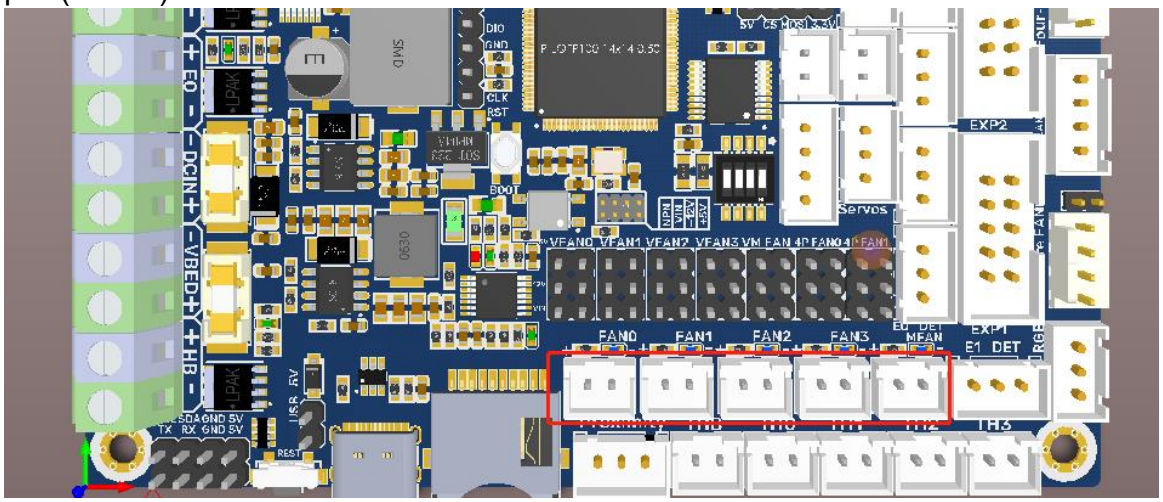


Note: Shorting the pins, as shown in the figure below, is strictly prohibited as it may result in permanent damage to the motherboard.



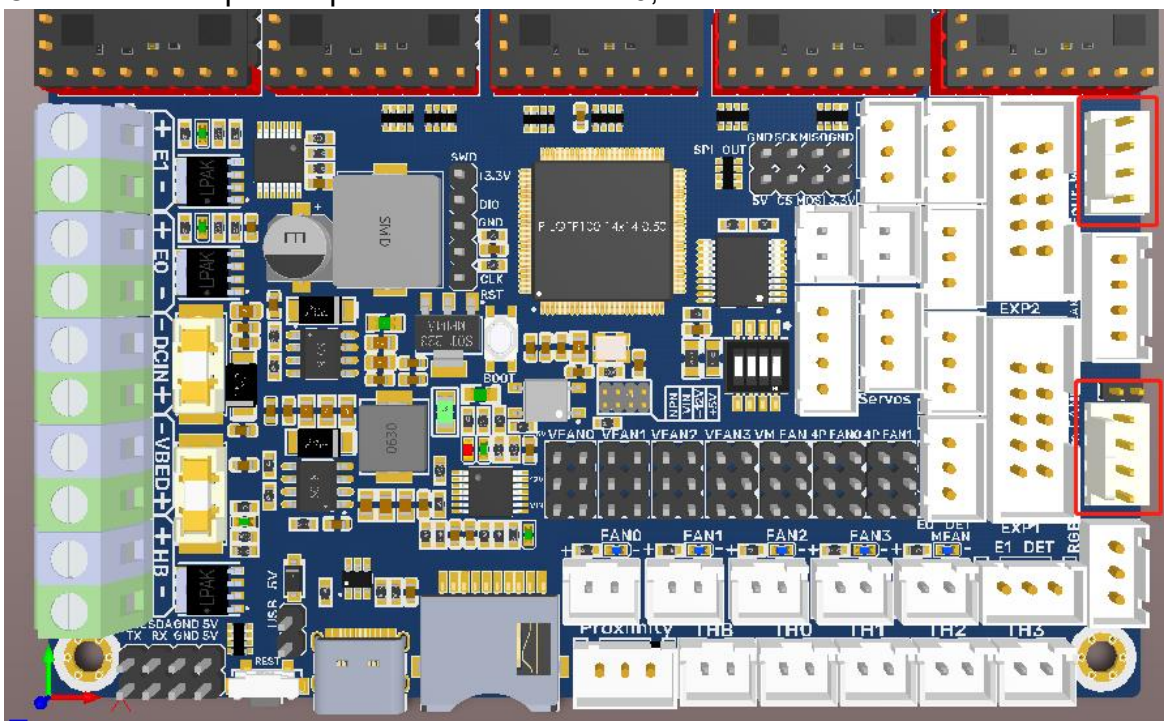
2-pin Fan Wiring

Onboard four 2-pin fan ports (FAN0,FAN1,FAN2,FAN3), one always on fan port(MFAN).



4-pin Fan Port Wiring

Onboard two 4-pin fan ports: Four-Wire FAN0, Four-Wire FAN1

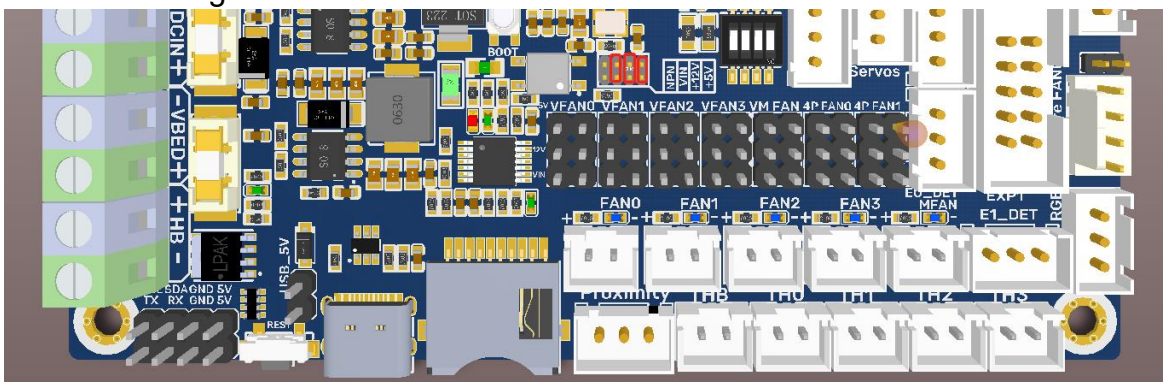


Note: Using a voltage that does not match a fan's rated working voltage can cause abnormal fan operation or damage. Always ensure that the selected voltage matches the fan's rated working voltage.

Proximity Switch

Voltage Selection

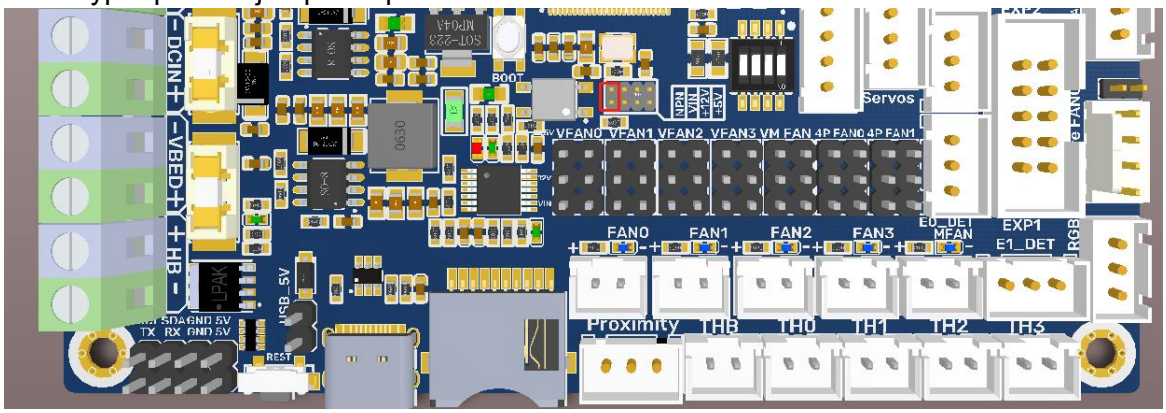
Use a jumper cap to short the corresponding pin to choose +12V, +5V, VIN, as shown in the figure below.



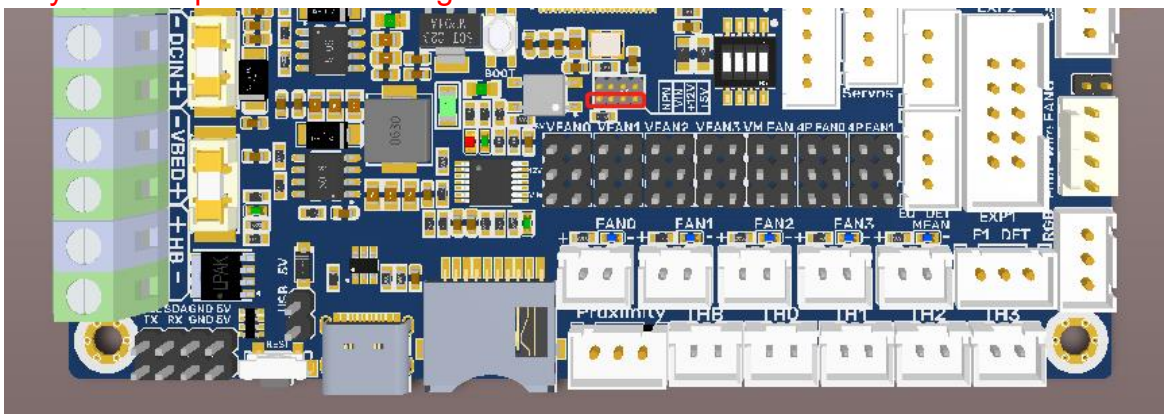
PNP/NPN Type

PNP Type: no need for a jumper cap.

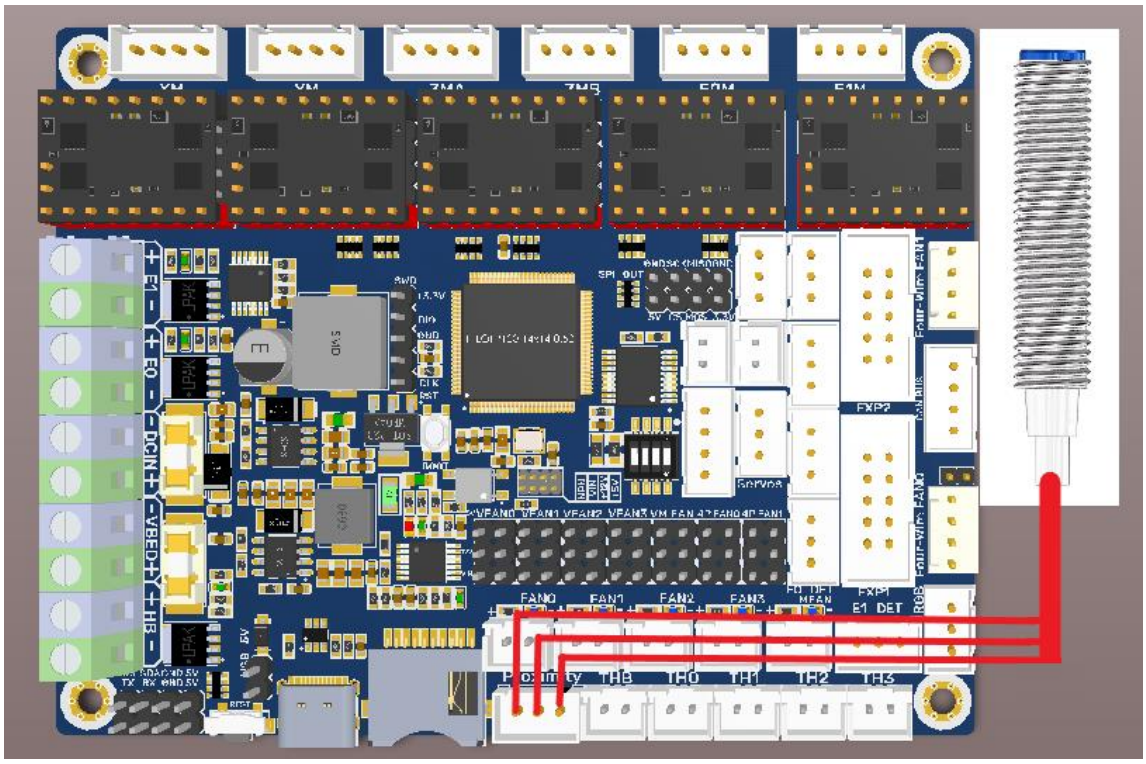
NPN Type: place a jumper cap.



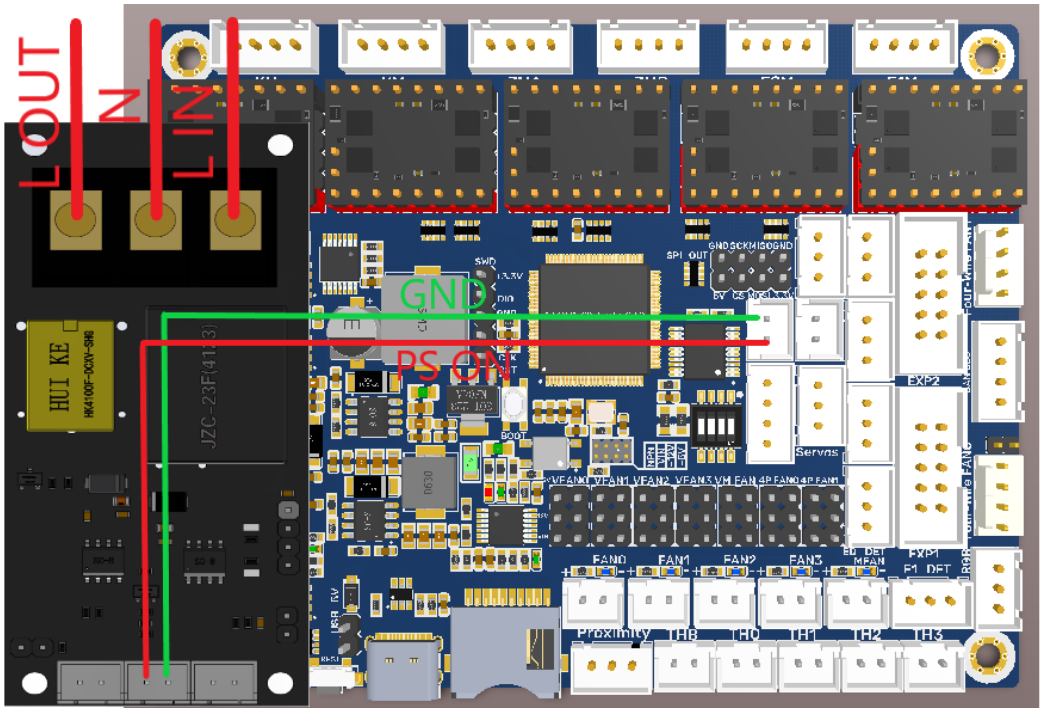
Note: Shorting the pins, as shown in the figure below, is strictly prohibited as it may result in permanent damage to the motherboard.



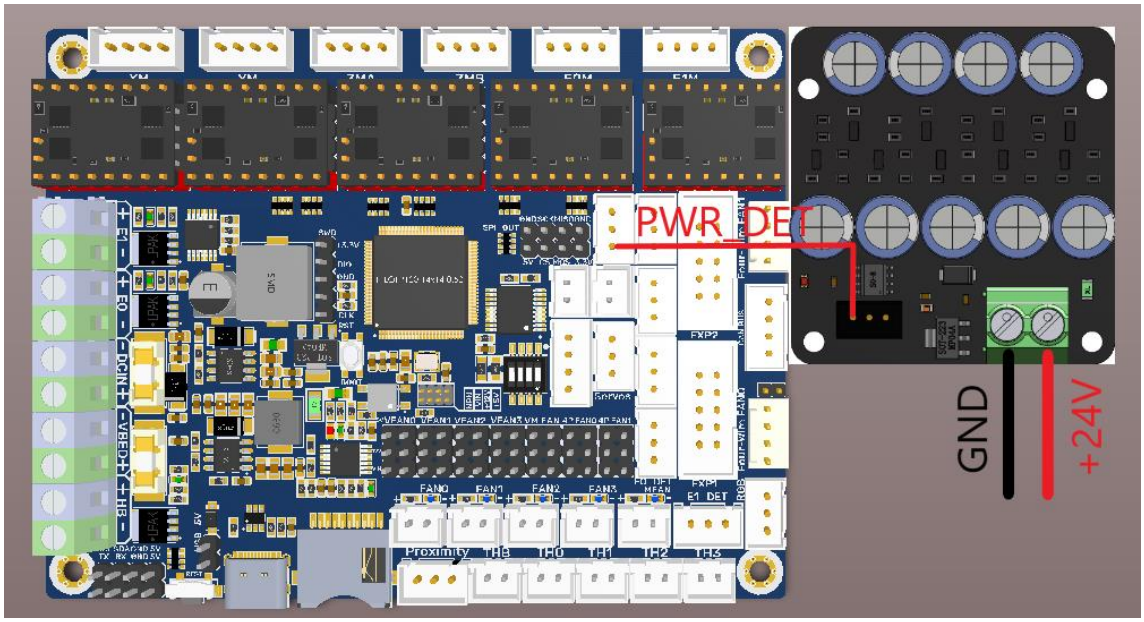
Proximity Switch Wiring



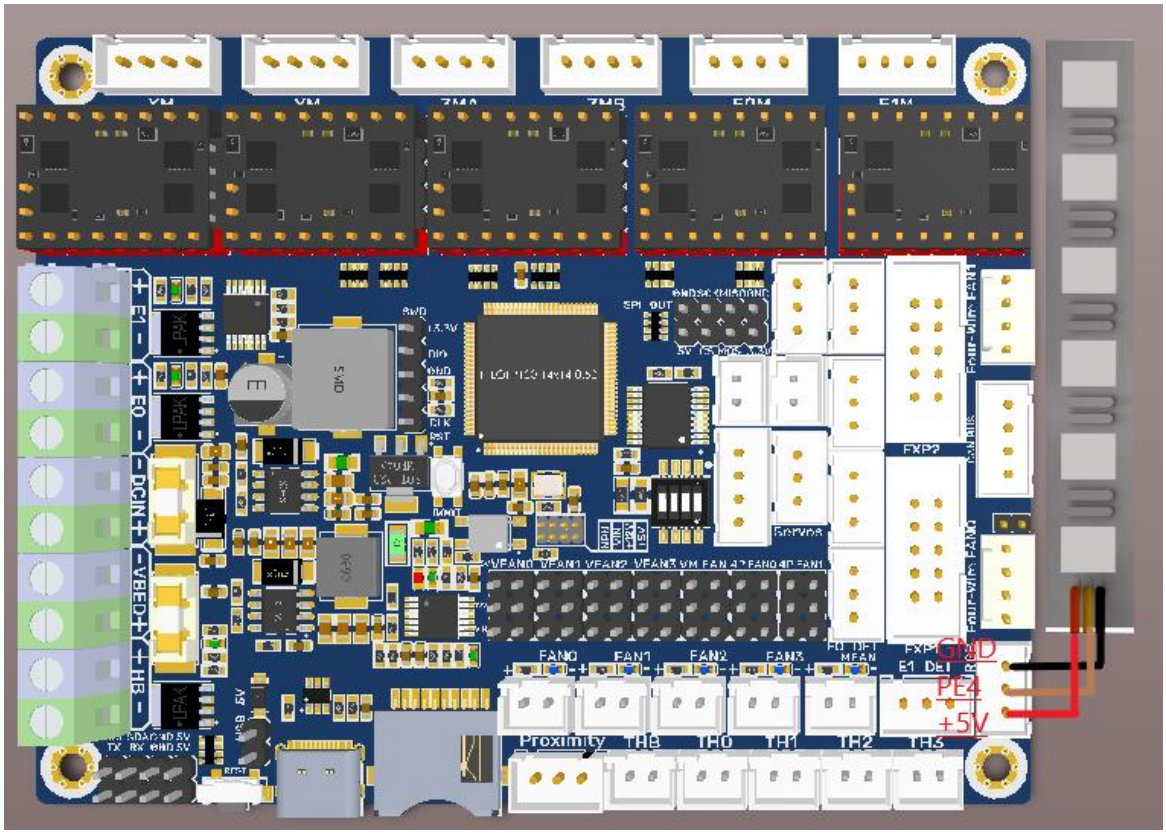
Auto Power off (BIGTREETECH Relay V1.2) Wiring



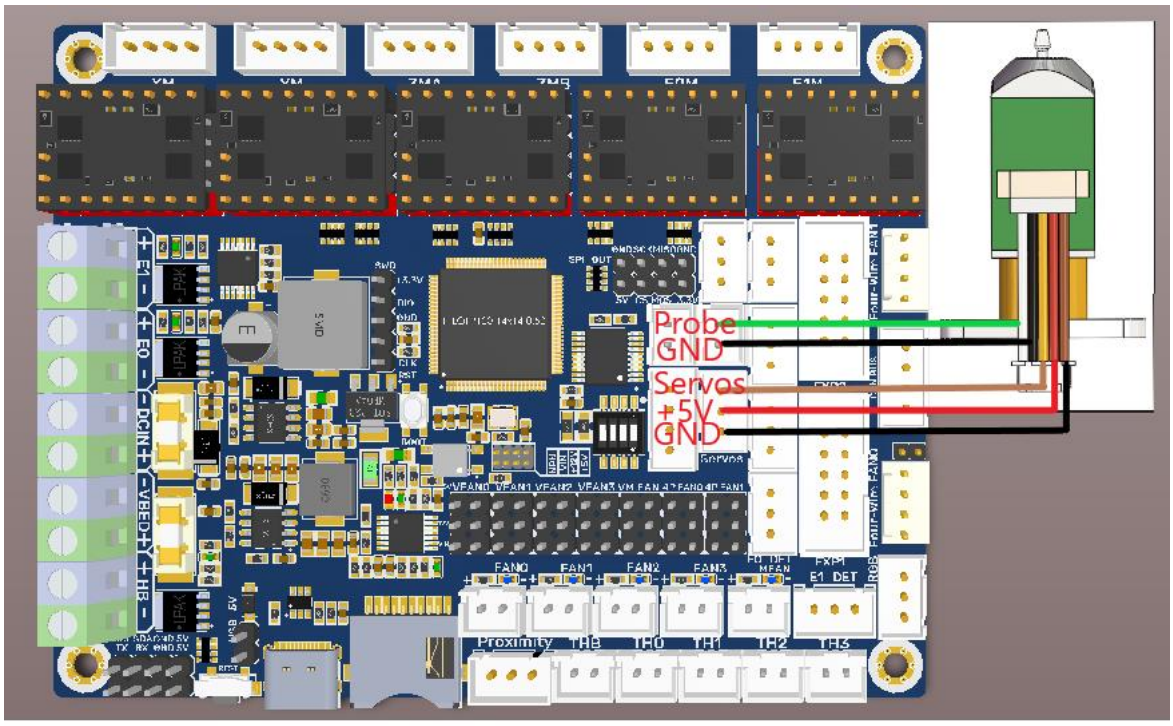
Power Loss Recovery (BTT UPS 24V V1.0) Wiring



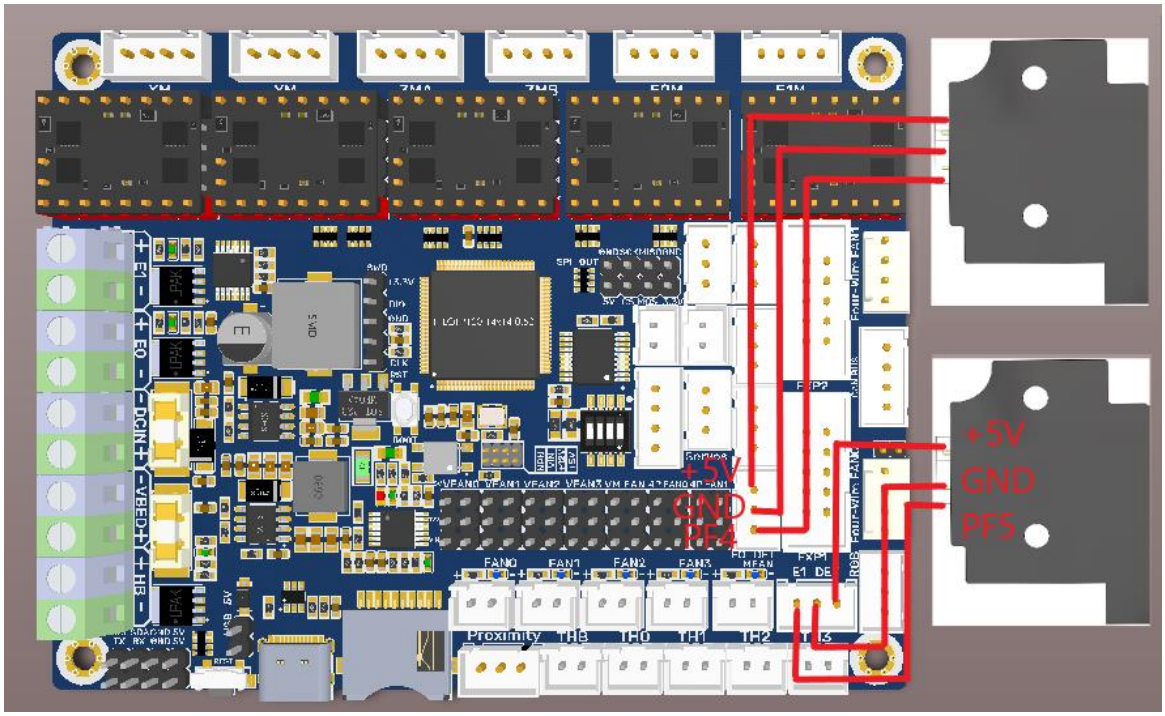
RGB Wiring



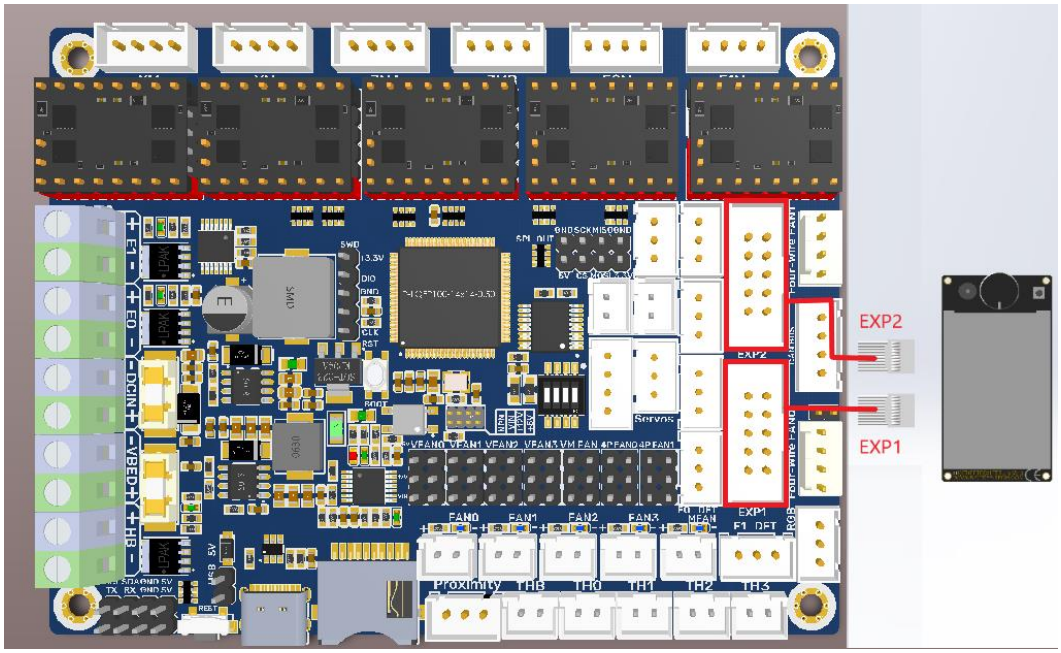
BLTouch Wiring



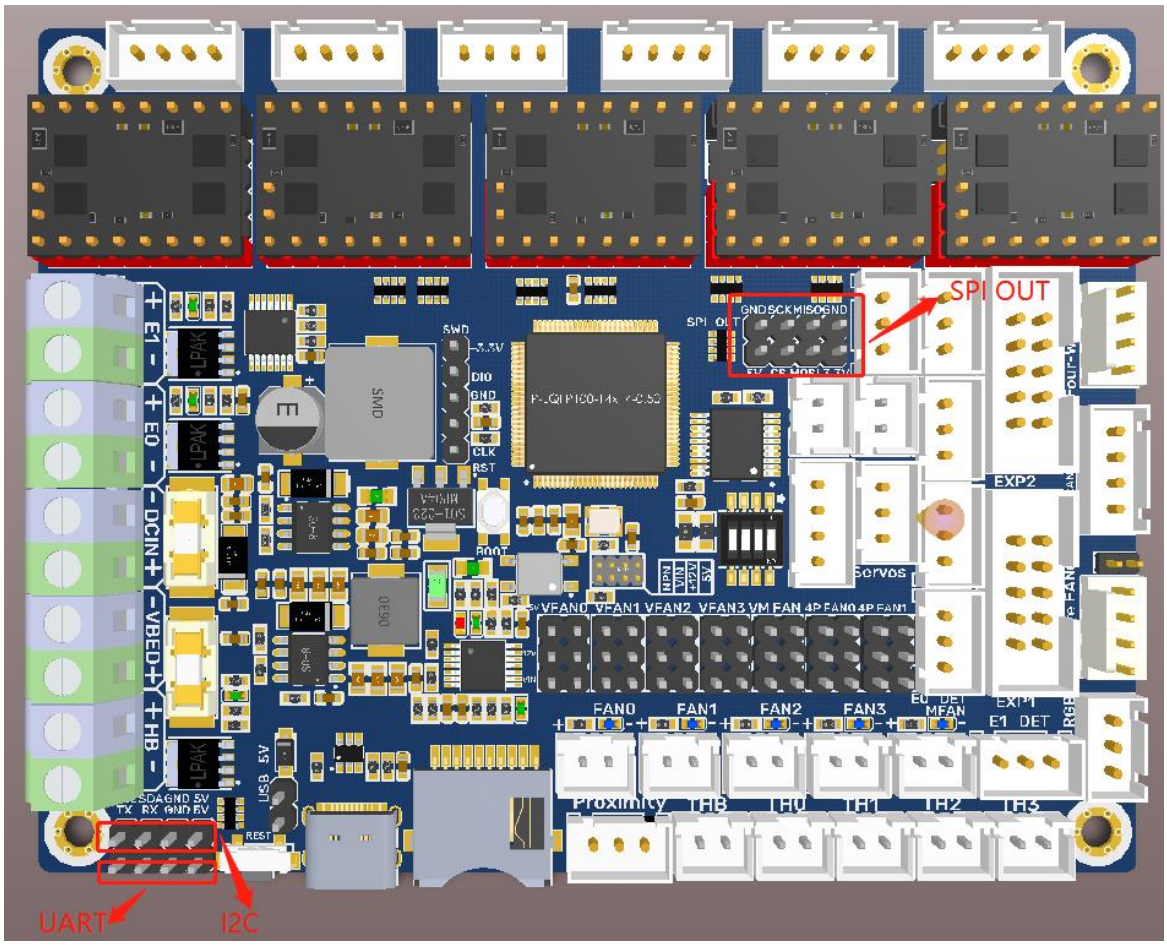
Filament Sensor Wiring



LCD Display Wiring

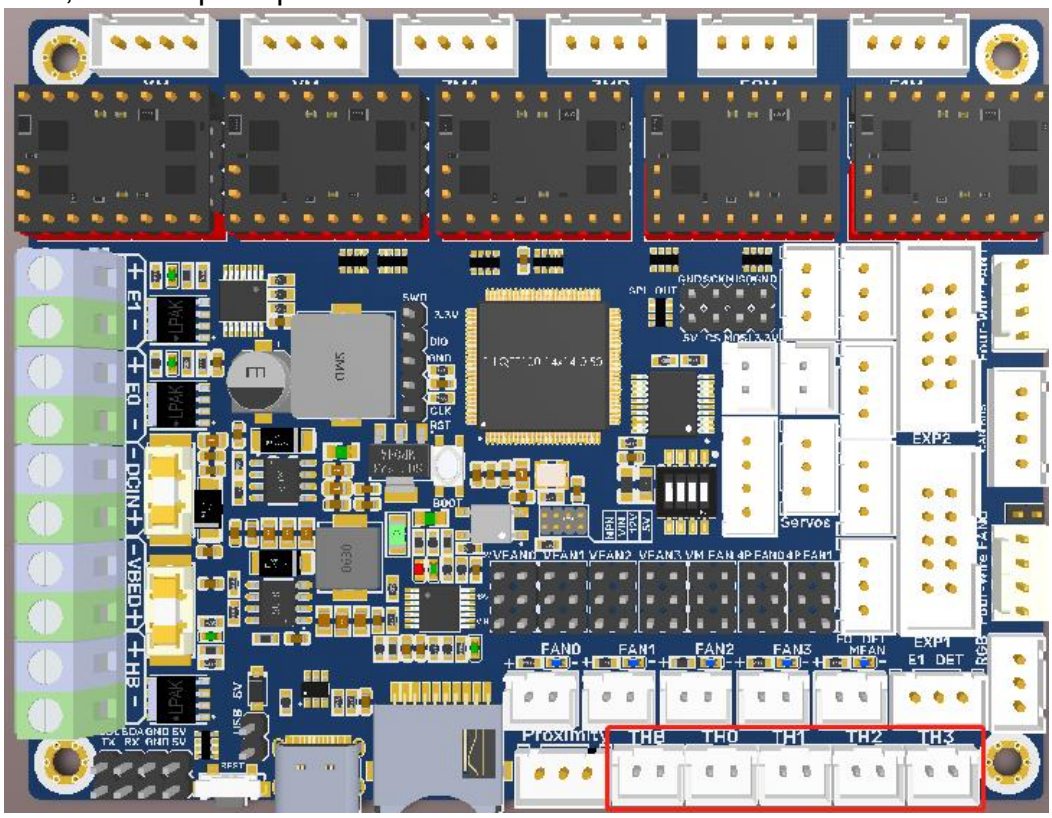


SPI, I2C, UART

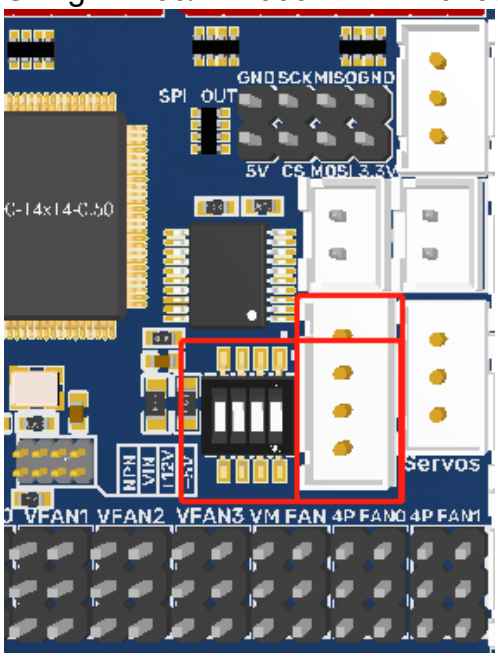


100K NTC

When using a 100K NTC thermistor, the NTC resistor is connected to THB, TH0-TH3, and the pull-up resistance of TH0-TH3 is 4.7K 0.1%.



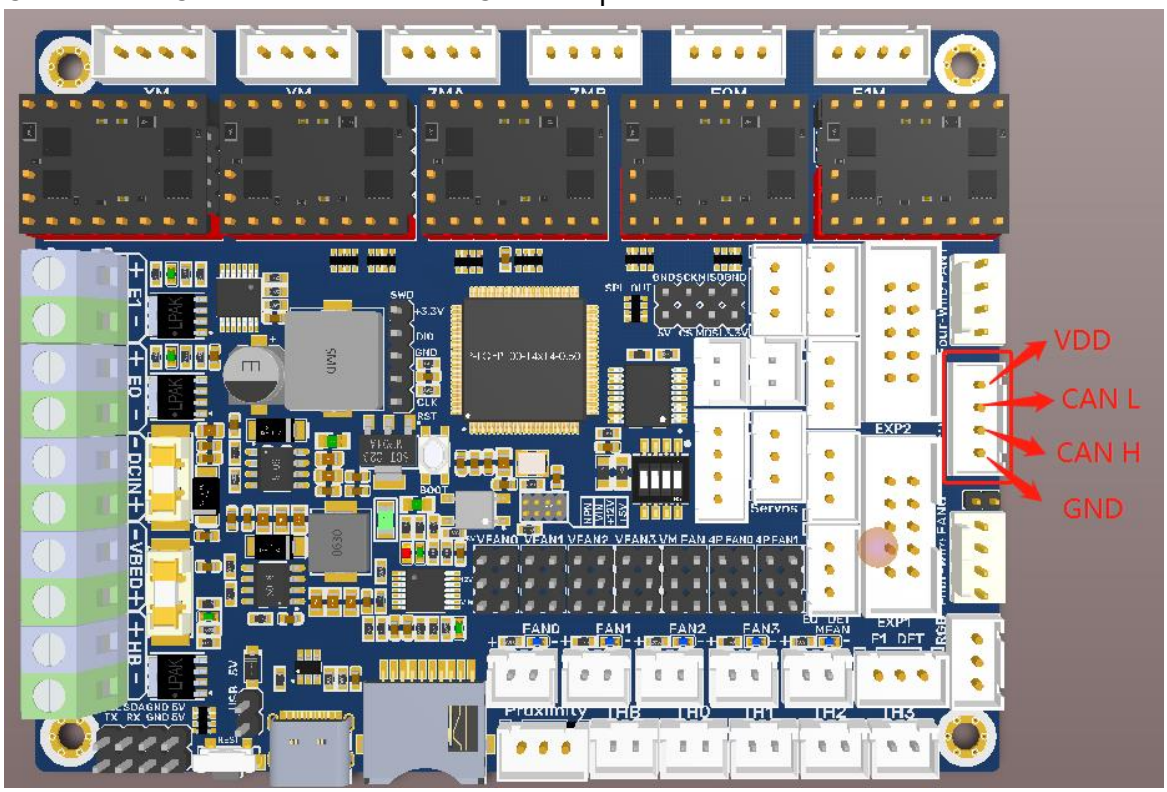
Using PT100/PT1000 via MAX31865:



1	2	3	4	SensorModel
ON	ON	ON	OFF	2lines PT00
ON	ON	OFF	ON	2lines PT1000
OFF	OFF	ON	OFF	4lines PT100
OFF	OFF	OFF	ON	4lines PT1000

CAN bus Wiring

Connect the CAN bus sensor to the CAN bus port on the board.



Note: The output voltage of the motherboard CAN bus port is the same as its input voltage.

Marlin

Install Compiling Environment

https://github.com/bigtreetech/Document/blob/master/How%20to%20install%20VScode%2BPlatformio.md
https://marlinfw.org/docs/basics/install_platformio_vscode.html
Refer to the link above for tutorial on installing VSCode and PlatformIO plugin.

Download Marlin Firmware

Download the newest bugfix version of Marlin from the official website:
https://github.com/MarlinFirmware/Marlin/tree/bugfix-2.0.x

Configure Firmware

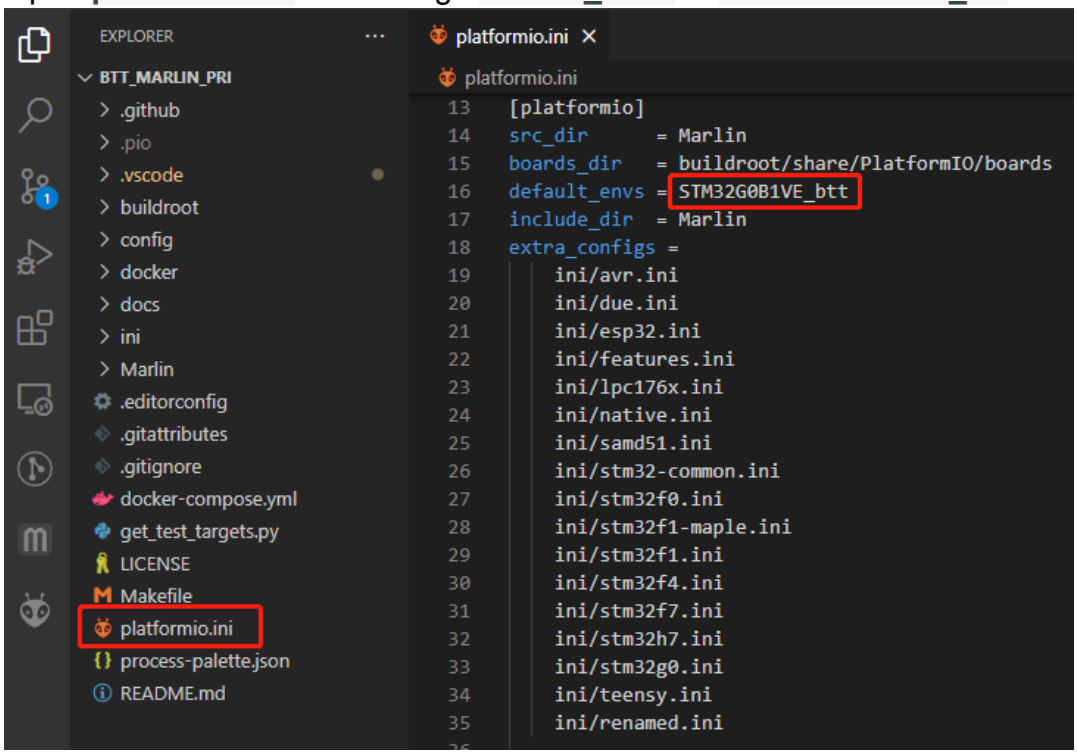
Open Marlin Project

You can open Marlin in VSCode in one of the following ways:

- Drag the downloaded Marlin Firmware folder onto the VSCode application icon.
- Use the **Open...** command in the VSCode **File** menu.
- Open the PIO Home tab and click the **Open Project** button.

Compiling Environment

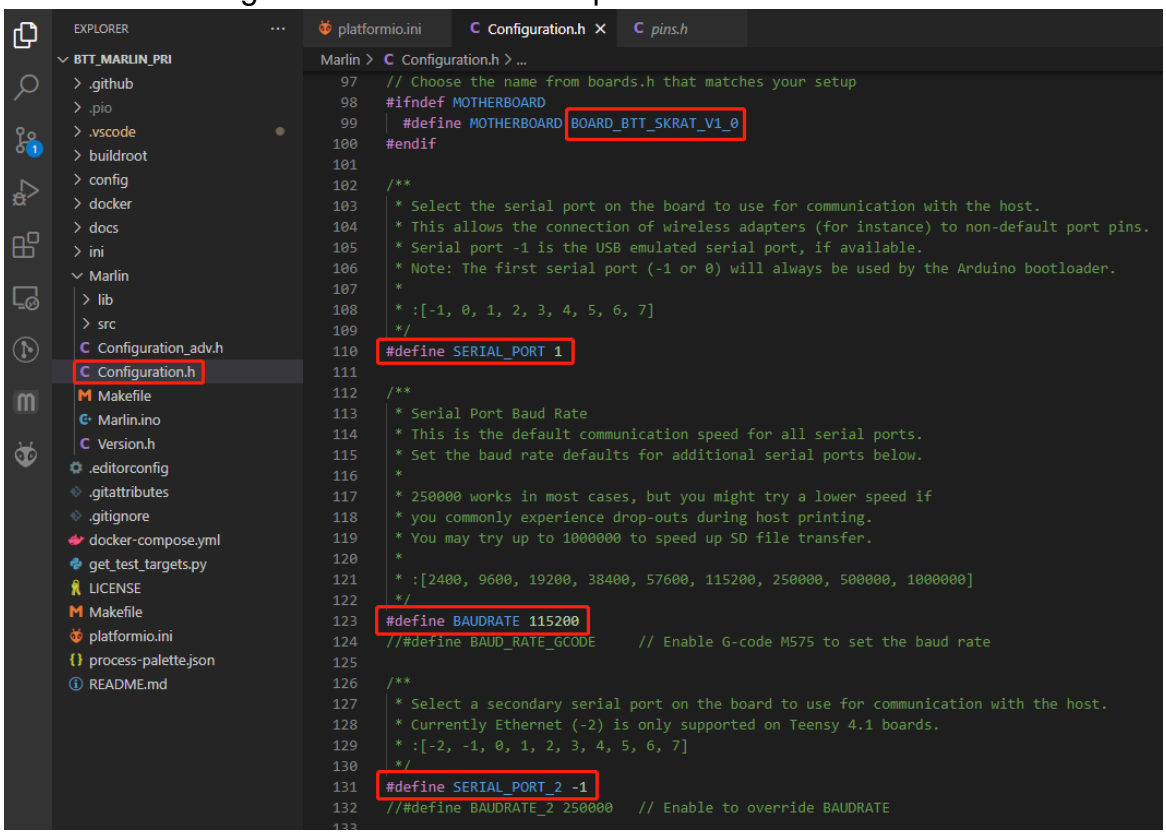
Open **platformio.ini** and change **default_envs** to **STM32G0B1VE_btt.**



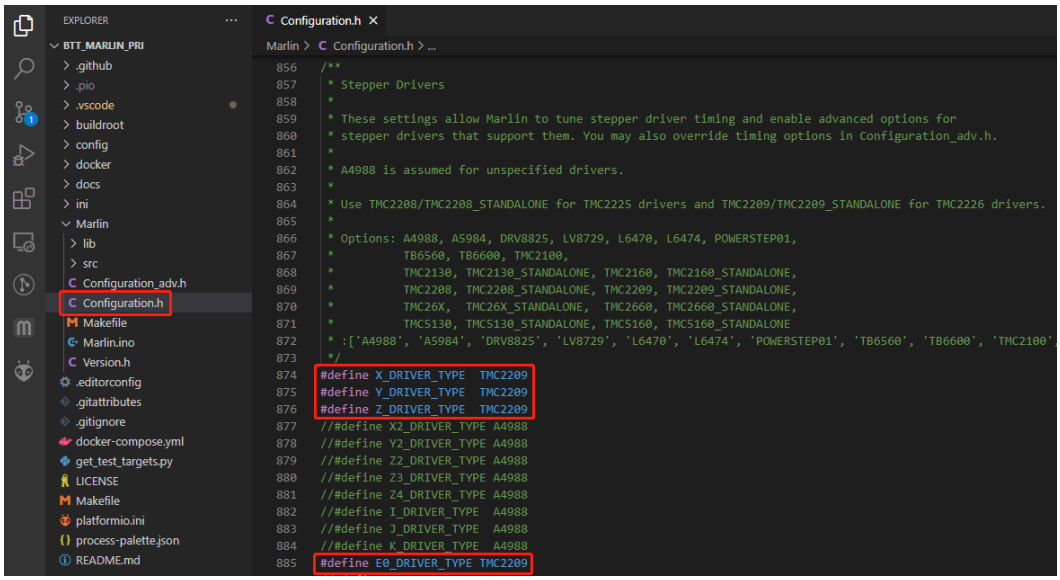
Configure Motherboard and Serial Port

Set MOTHERBOARD to **BOARD_BTT_SKRAT_V1_0**

#define MOTHERBOARD BOARD_BTT_SKRAT_V1_0
#define SERIAL_PORT 1 (enable TFT serial port)
#define BAUDRATE 115200 (set baudrate to the same as the communication device)
#define SERIAL_PORT_2 -1 (enable USB serial port)
The above settings can be enabled as required.

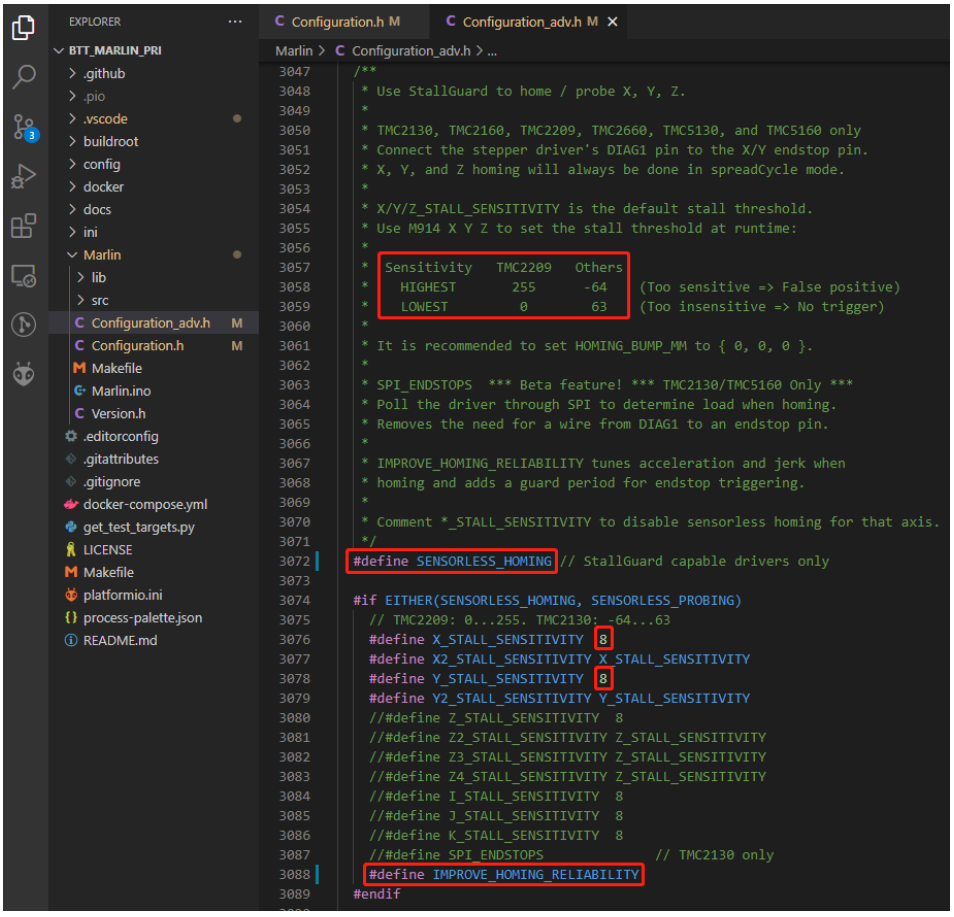


Configure Stepper Driver



Insert the jumper corresponding to the driver mode and set the driver type in the firmware.

Sensorless Homing

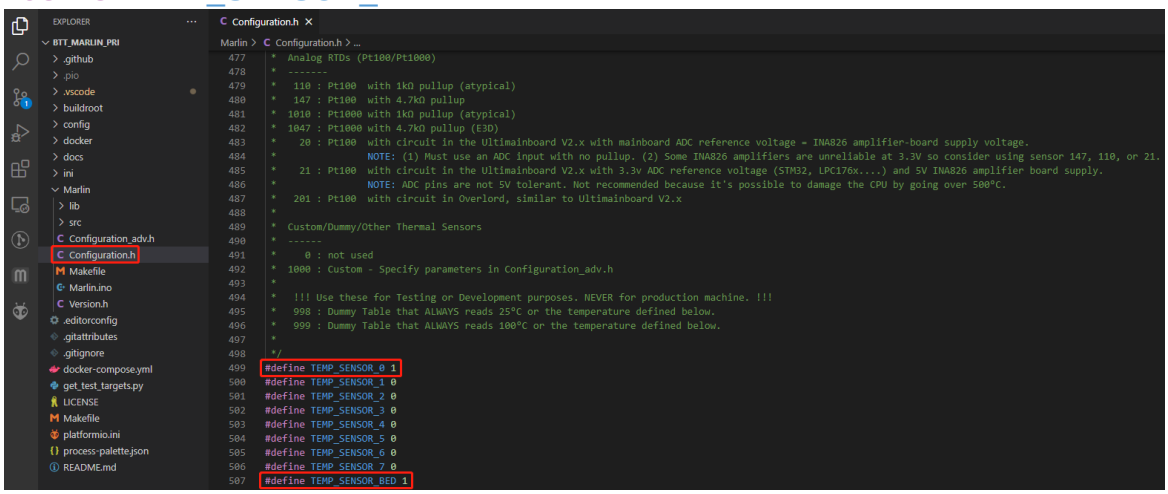


#define SENSORLESS_HOMING // enable sensorless homing

#define xx_STALL_SENSITIVITY 8 // sensitivity setting, TMC2209 range from 0 to 255, higher number results in more sensitive trigger threshold, sensitivity too high will cause endpoint to trigger before gantry actually move to the end, lower number results in less sensitive trigger threshold, too low of sensitivity will cause endpoint to not trigger and gantrying continue.
#define IMPROVE_HOMING_RELIABILITY // can be used to set independent motor current for homing moves(xx_CURRENT_HOME) to improve homing reliability.

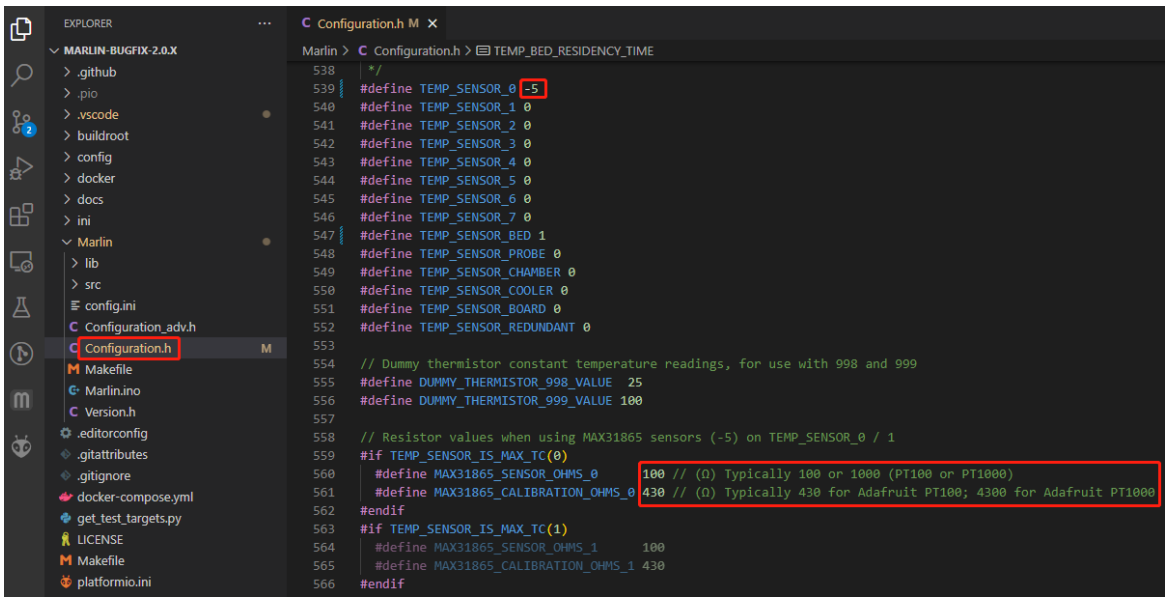
100K NTC

In Marlin, 1 stands for 100K NTC +4.7K pull-up resistance.
#define TEMP_SENSOR_0 1
#define TEMP_SENSOR_BED 1

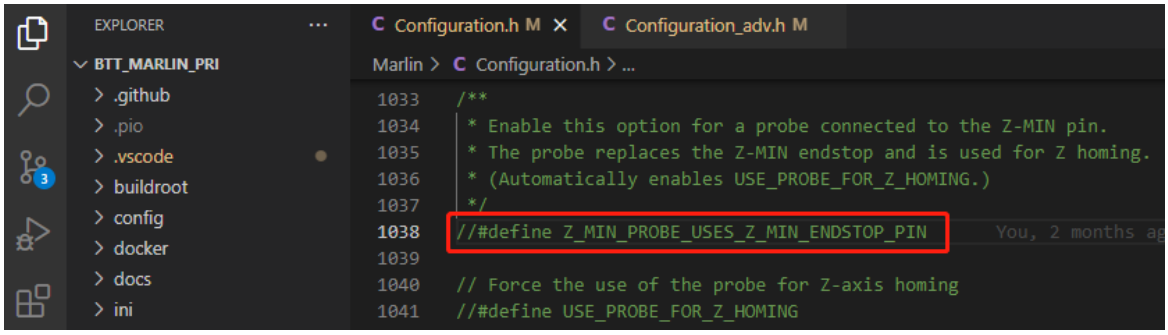


Max31865

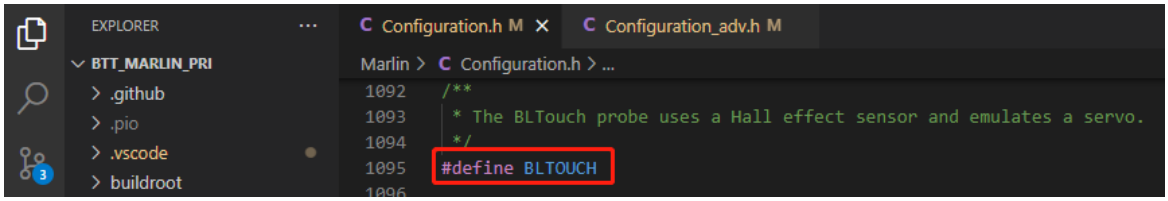
In Marlin, -5 stands for MAX31865
#define MAX31865_SENSOR_OHMS_0 100 // PT100:100，PT1000:1000
#define MAX31865_CALIBRATION_OHMS_0 430 // PT100:430，PT1000:4300



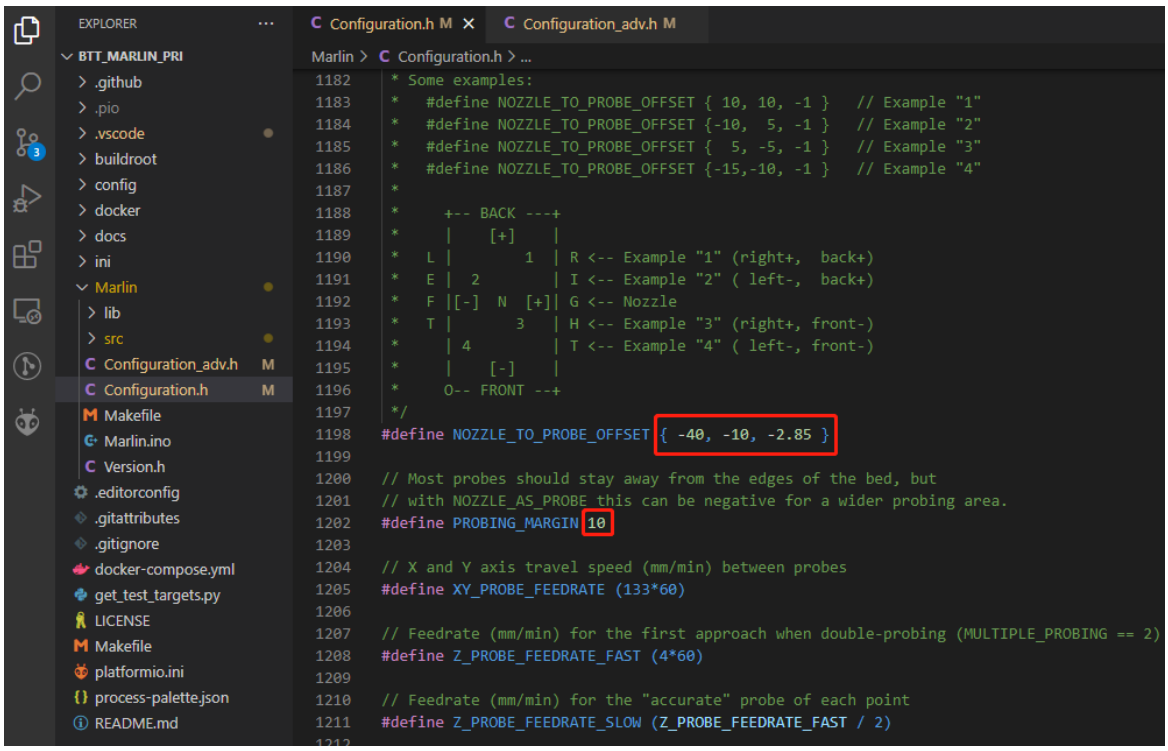
BLTouch



//#define Z_MIN_PROBE_USES_Z_MIN_ENDSTOP_PIN //

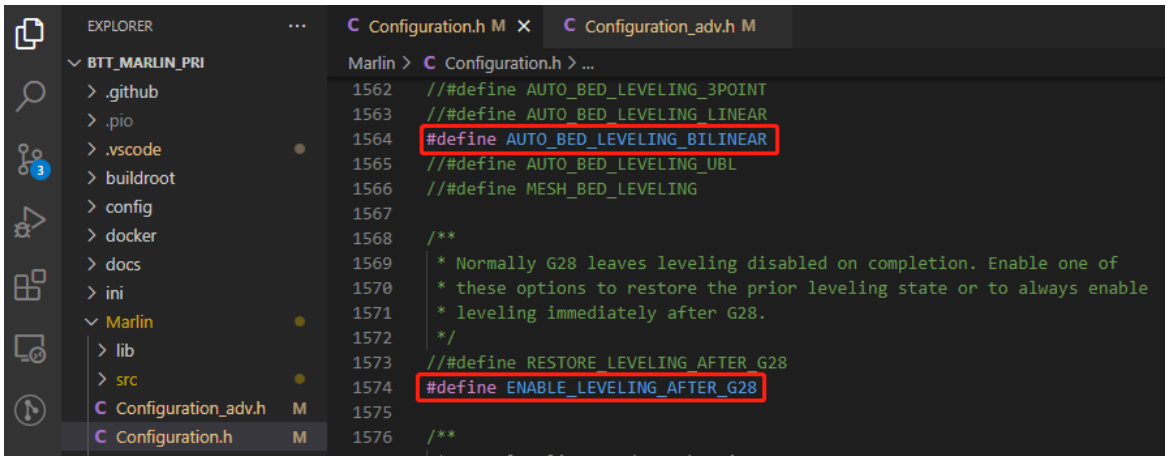


#define BLTOUCH // Enable BLTouch

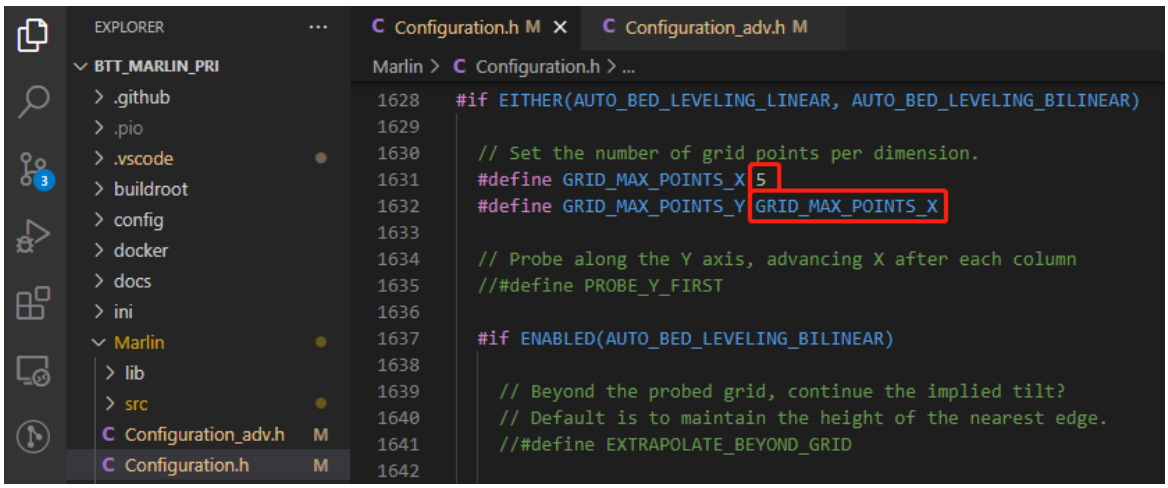


#define NOZZLE_TO_PROBE_OFFSET { -40, -10, -2.85 } // set BLTouch probe offset

#define PROBING_MARGIN 10 // set distance between probe area and print area perimeter

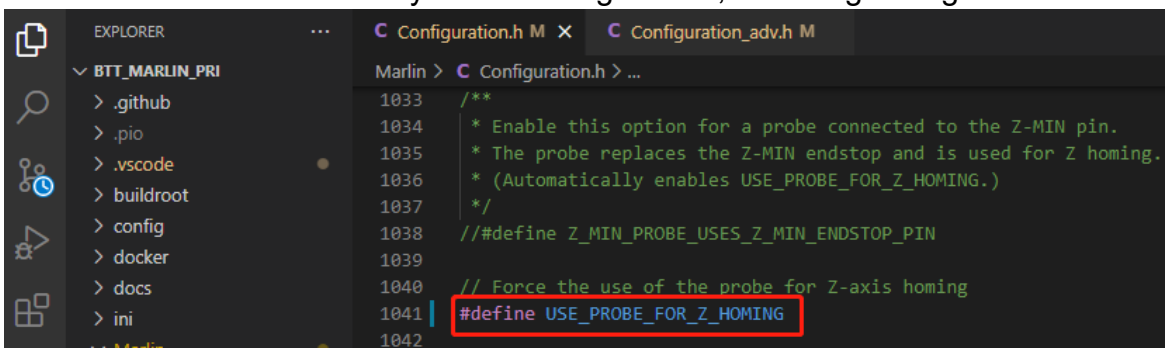


#define AUTO_BED_LEVELING_BILINEAR // set probe pattern
#define RESTORE_LEVELING_AFTER_G28 // apply leveling after G28 homing command

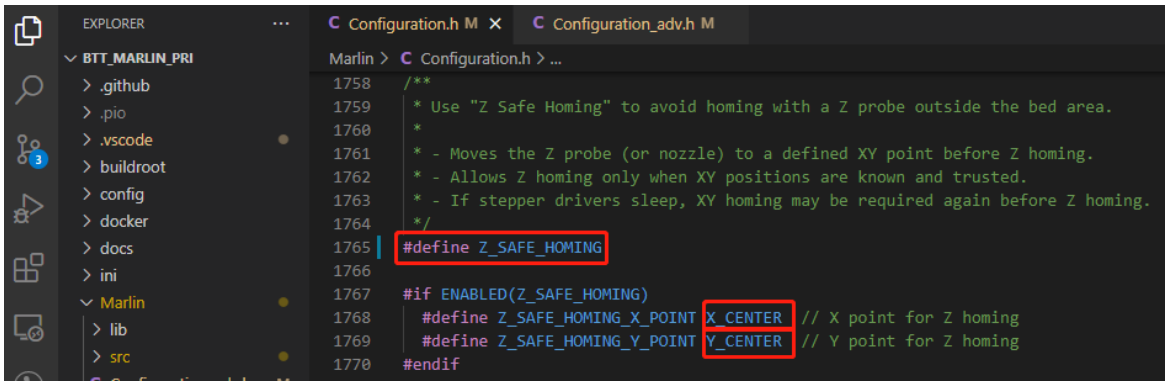


#define GRID_MAX_POINTS_X 5 // set number of probe points for X axis, usually 5 point is sufficient
#define GRID_MAX_POINTS_Y GRID_MAX_POINTS_X // set number of probe points for Y axis to the same as X axis

If BLTouch also functions as your Z homing sensor, no wiring change is needed.

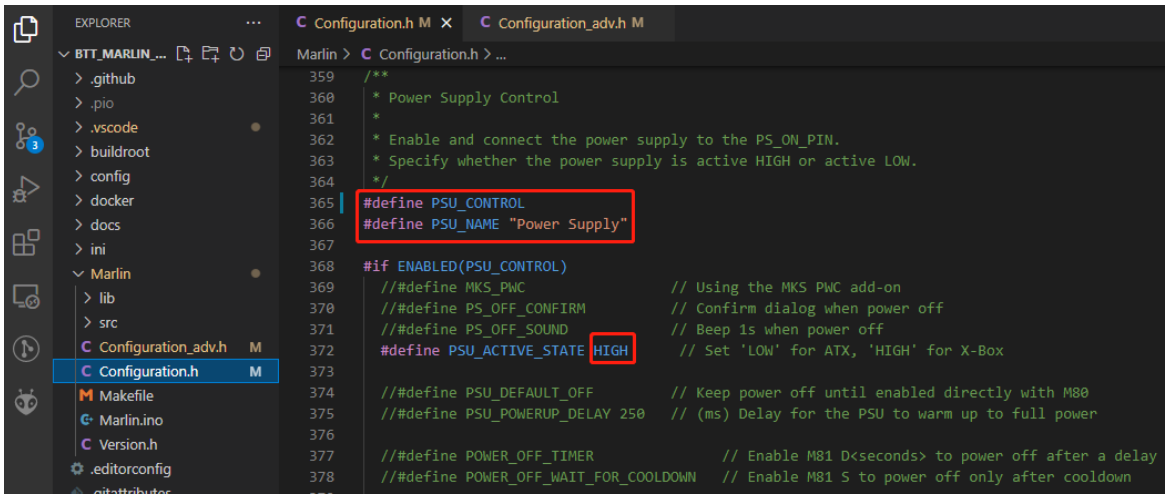


#define USE_PROBE_FOR_Z_HOMING // use Z Probe(BLTouch) for Z homing.



#define Z_SAFE_HOMING // home Z at the center of print bed to prevent probing outside of the print bed

Auto Power Off (Relay V1.2)



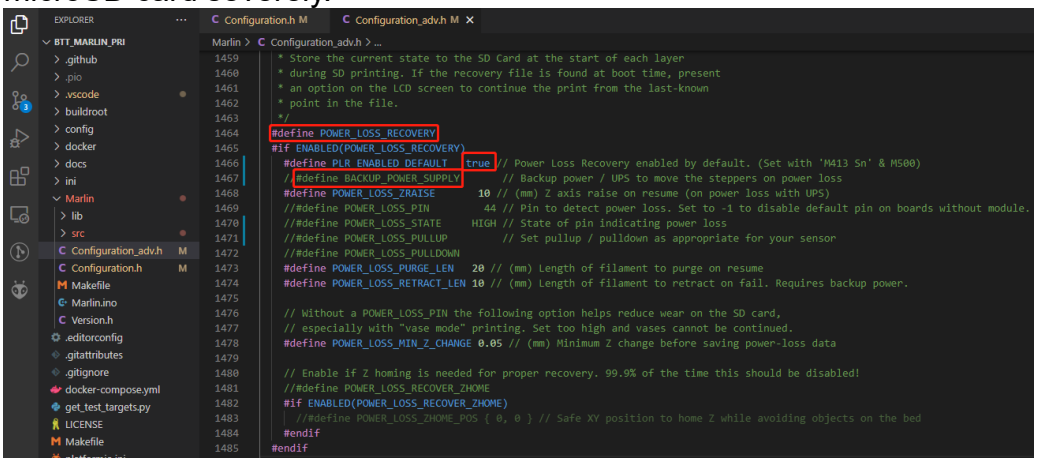
#define PSU_CONTROL // enable PSU control to turn on and off using M80 and M81

#define PSU_ACTIVE_STATE HIGH // set turn on level, Relay V1.2 is turned on with high level and turned off with low level, so this setting needs to be HIGH.

Power Loss Recovery

There are two methods for power loss recovery:

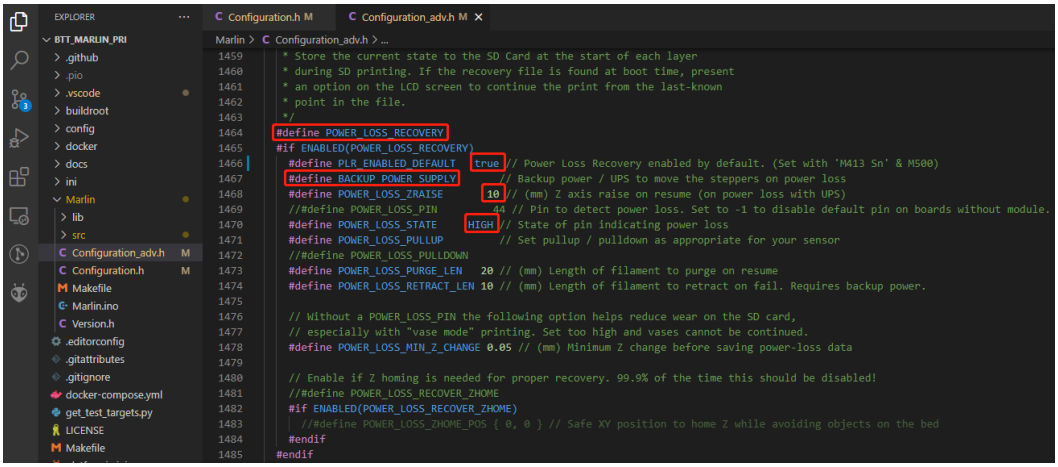
1. No extra module is needed, the motherboard will write the current print status to the microSD card after every layer is printed, which shortens the life of the microSD card severely.



#define POWER_LOSS_RECOVERY // enable power loss recovery
#define PLR_ENABLED_DEFAULT true // true default to power loss recovery enabled

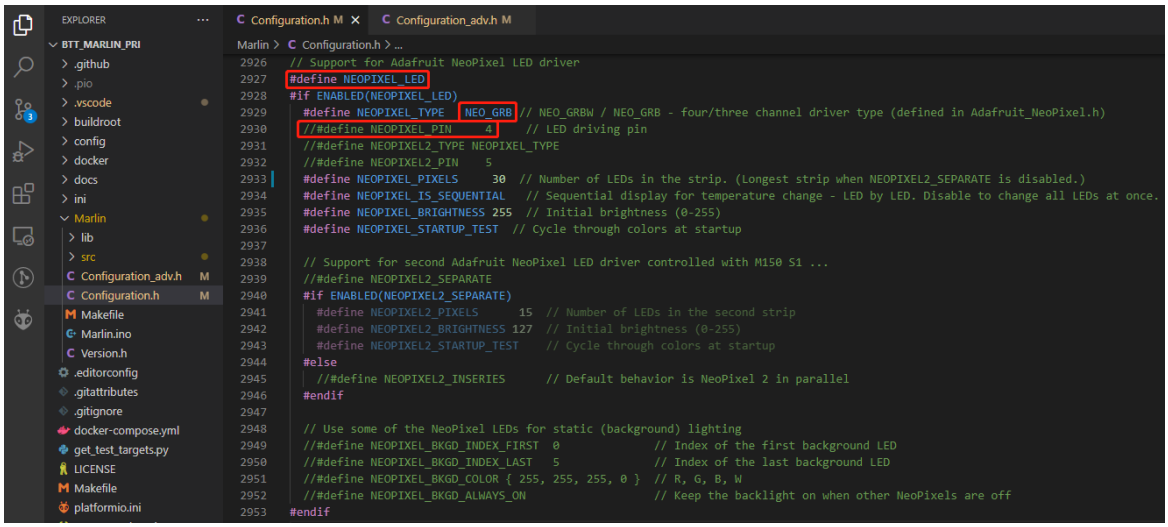
2. External UPS 24V V1.0 module, when power is cut, the module will provide power to the board and signal the board to save the current print status to the microSD card. This method has virtually no effect on the life of the microSD

card.



#define POWER_LOSS_RECOVERY // enable power loss recovery
#define PLR_ENABLED_DEFAULT true // true default to power loss recovery enabled
#define POWER_LOSS_ZRAISE 10 // raise the print head by 10mm after power loss to prevent the nozzle from touching the printed part
#define POWER_LOSS_STATE HIGH // set signal level, UPS 24V V1.0 returns a low level when not triggered and a HIGH level when power is cut, thus this setting needs to be HIGH.

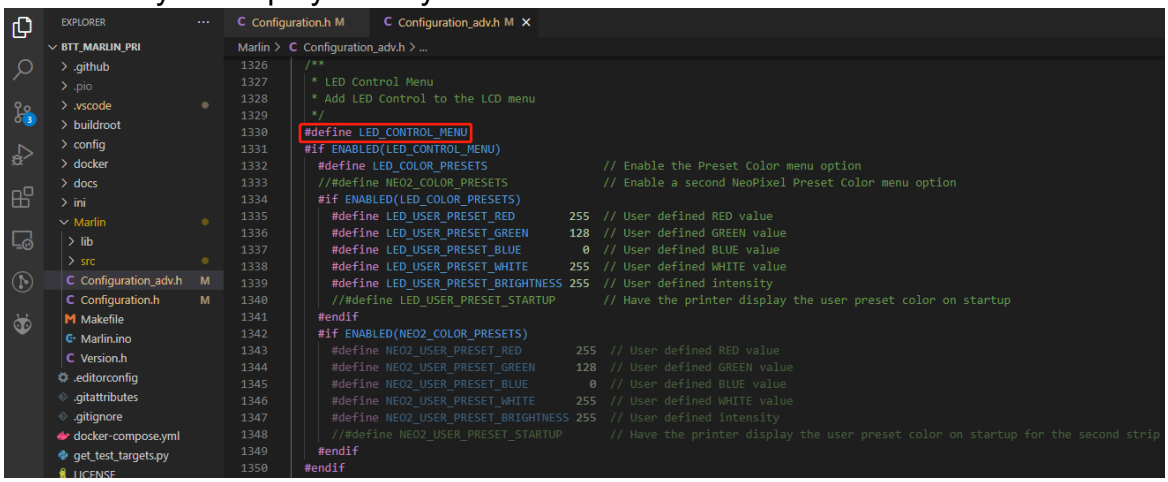
RGB



#define NEOPIXEL_LED // enable Neopixel
#define NEOPIXEL_TYPE NEO_GRB // set Neopixel type
//#define NEOPIXEL_PIN 4 // disable PIN setting, use the correct signal pin in the pin file of the motherboard
#define NEOPIXEL_PIXELS 30 // number of LEDs

#define NEOPIXEL_STARTUP_TEST // the light will show red green and blue sequentially to self-test.

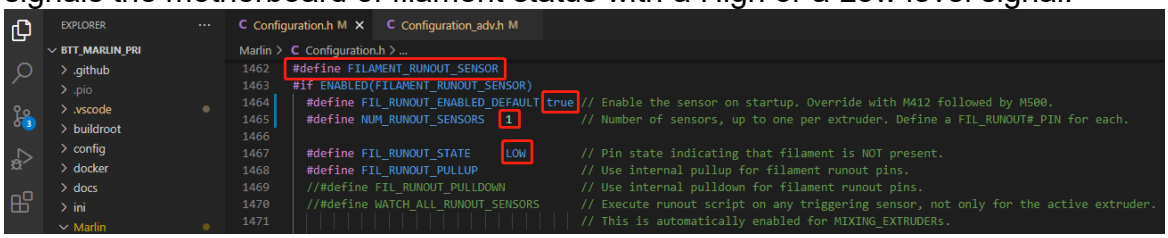
If you are using displays like CR10_STOCKDISPLAY, etc., you can also control RGB from your display directly.



#define LED_CONTROL_MENU // Add LED control to your menu

Filament Sensor

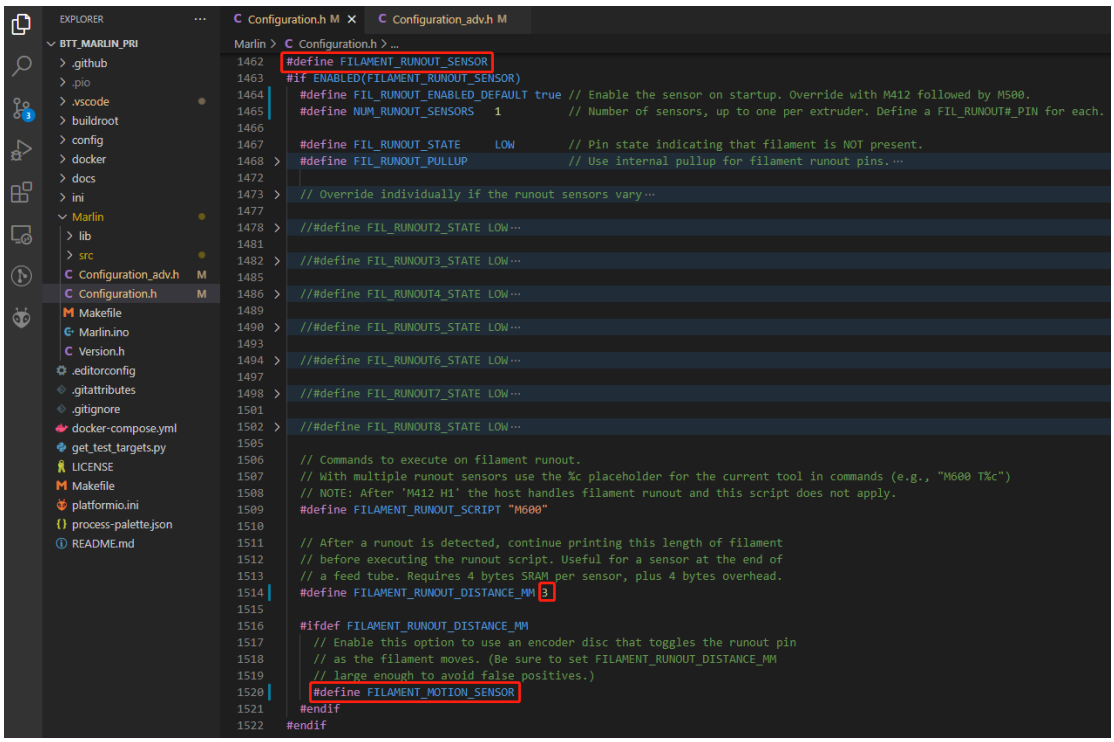
Standard filament run out sensors are usually comprised of a micro switch that signals the motherboard of filament status with a High or a Low level signal.



#define FILAMENT_RUNOUT_SENSOR // enable filament run out sensor
#define FIL_RUNOUT_ENABLED_DEFAULT true // true default to filament run out sensor enabled
#define NUM_RUNOUT_SENSORS 1 // number of filament run out sensor
#define FIL_RUNOUT_STATE LOW // voltage level of the filament runout sensor trigger signal.

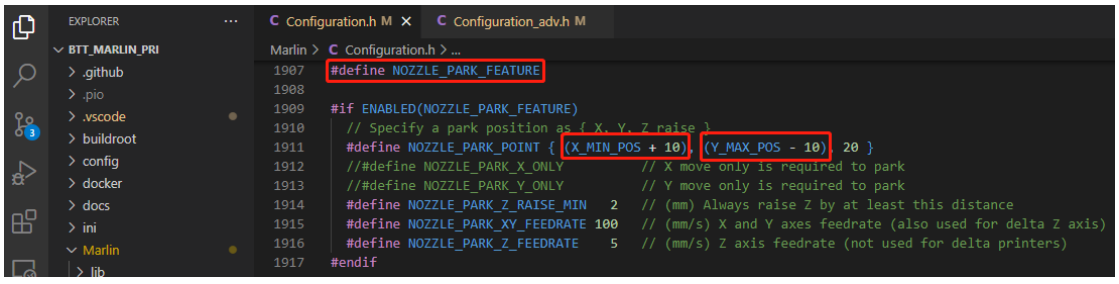
Smart Filament Sensor(SFS V1.0)

The smart filament sensor works by continuously sending signals to the motherboard to communicate filament status.

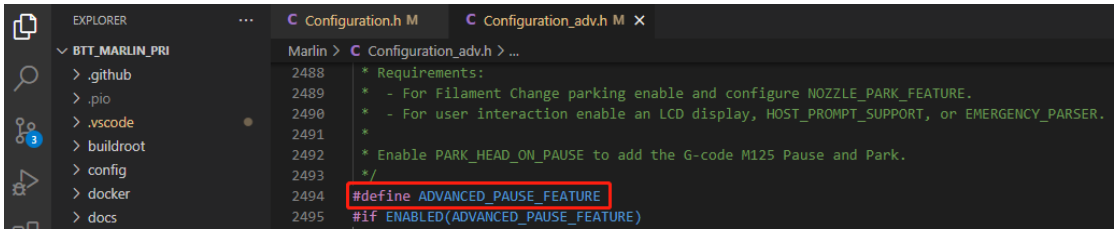


#define FILAMENT_MOTION_SENSOR // set encoder type
#define FILAMENT_RUNOUT_DISTANCE_MM 7 // set sensitivity, SFS V1.0 nominal setting should be 7mm, which means if no signal of filament movement is detected after 7mm of filament travel command, filament error will be triggered.

The settings below also need to be set to instruct the printer to park the nozzle after a filament error is detected.



#define NOZZLE_PARK_FEATURE // park nozzle
#define NOZZLE_PARK_POINT { (X_MIN_POS + 10), (Y_MAX_POS - 10), 20 } // set the X,Y, and Z offset coordinate of the nozzle

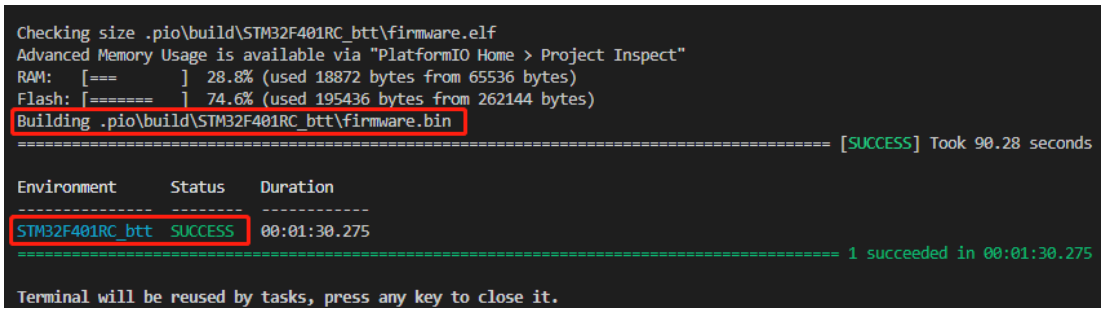


#define ADVANCED_PAUSE_FEATURE // retraction setting of nozzle park movement and filament purge distance after the print is resumed

Compile Firmware

1. Click "√" to compile the firmware.

2. Copy the compiled "firmware.bin" to microSD card and insert to motherboard to update firmware.



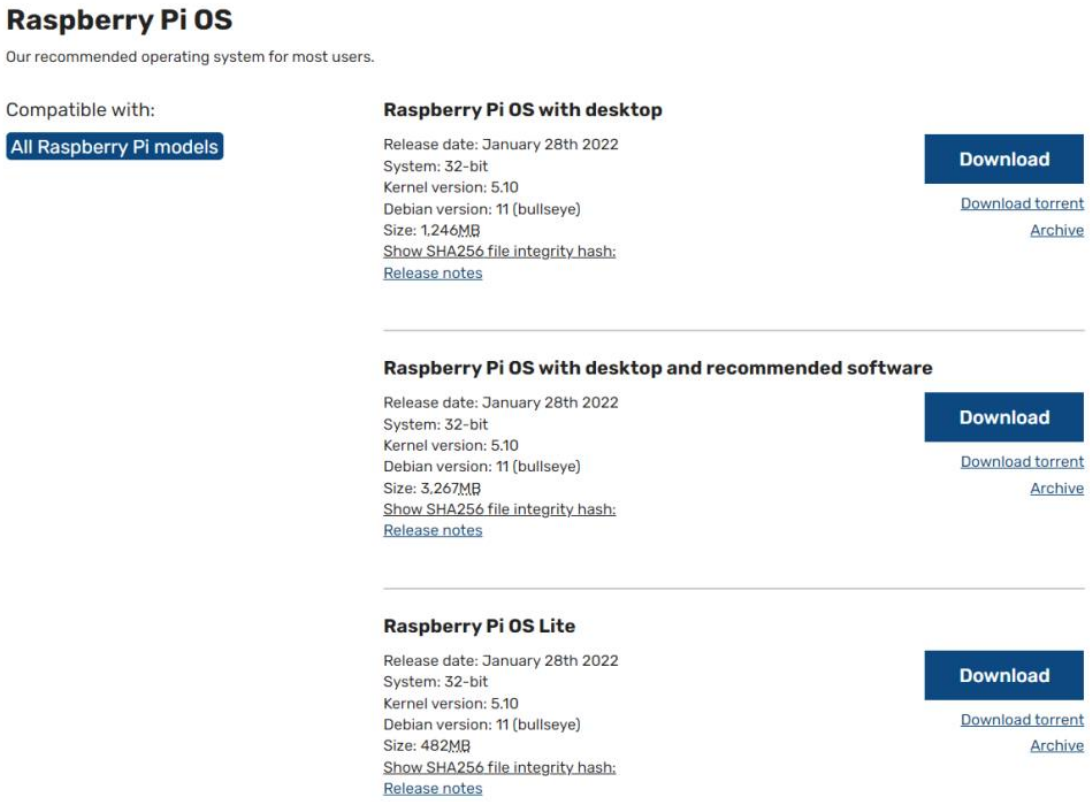
Klipper

Using Raspberry Pi

Download OS Image

When using CM4, download the image of Fluidd, Mainsail directly, also, you can download a pure OS image from the Raspberry Pi official website:

Fluidd: https://github.com/fluidd-core/FluiddPI/releases
Mainsail: https://github.com/mainsail-crew/MainsailOS/releases
Official Raspberry Pi OS Image: https://www.raspberrypi.com/software/operating-systems
(The usage of CM4 is slightly different from the standard Raspberry Pi 3B, 4B, etc., CM4 needs to refer to the system settings section to enable the system's USB, DSI, and other interfaces).

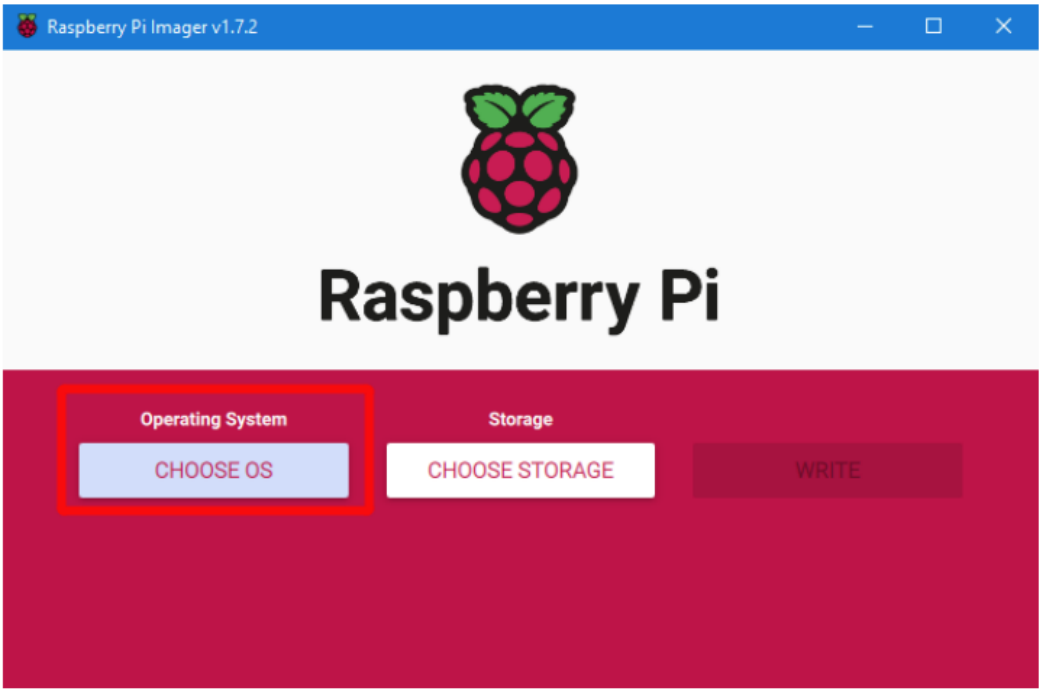


Download and Install Raspberry Pi Imager

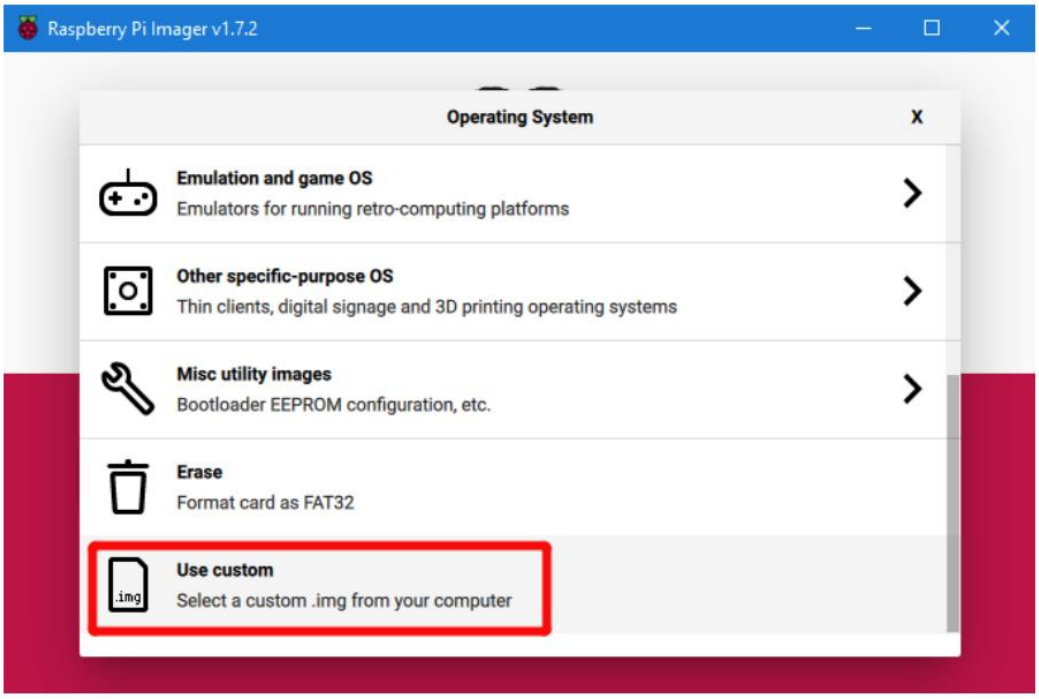
Install the official Raspberry Pi Imager https://www.raspberrypi.com/software/

Write Image

1. Insert a microSD card into your computer.
2. Choose OS.

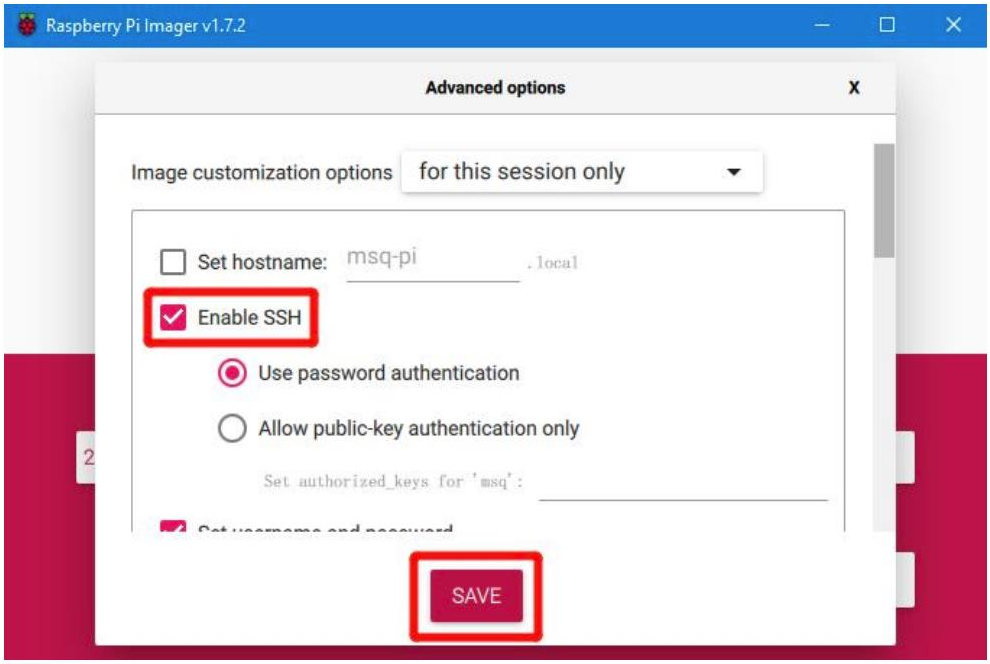


3. Select "Use custom", then select the image that you downloaded.



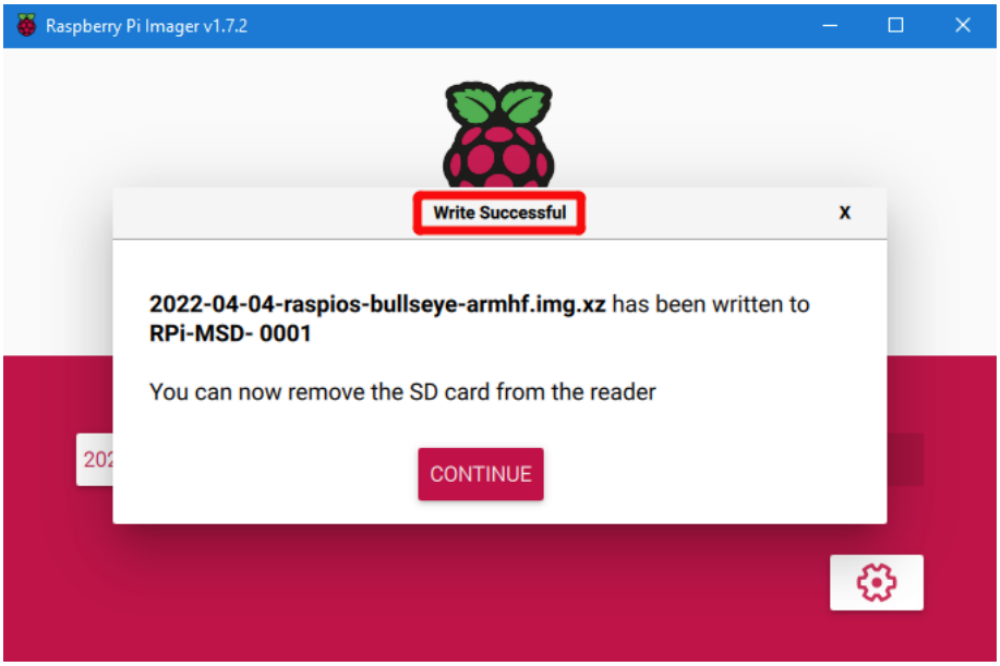
4. Click the settings icon in the lower right corner.

5. "Enable SSH" and then click "Save", there are other functions that can be set in this interface, please modify them according to your needs. Details are as follows:
Set hostname: raspberrypi.local // custom hostname, default is raspberrypi.local
Enable SSH
Set username and password // custom username and password, default username: pi, password: raspberry
Configure wireless LAN // custom WiFi name and password



6. Select the microSD card and click "WRITE" (WRITE the image will format the microSD card. Be careful not to select the wrong storage device, otherwise the data will be formatted).

7. Wait for the writing to finish.



Using BIGTREETECH CB1

Download OS Image

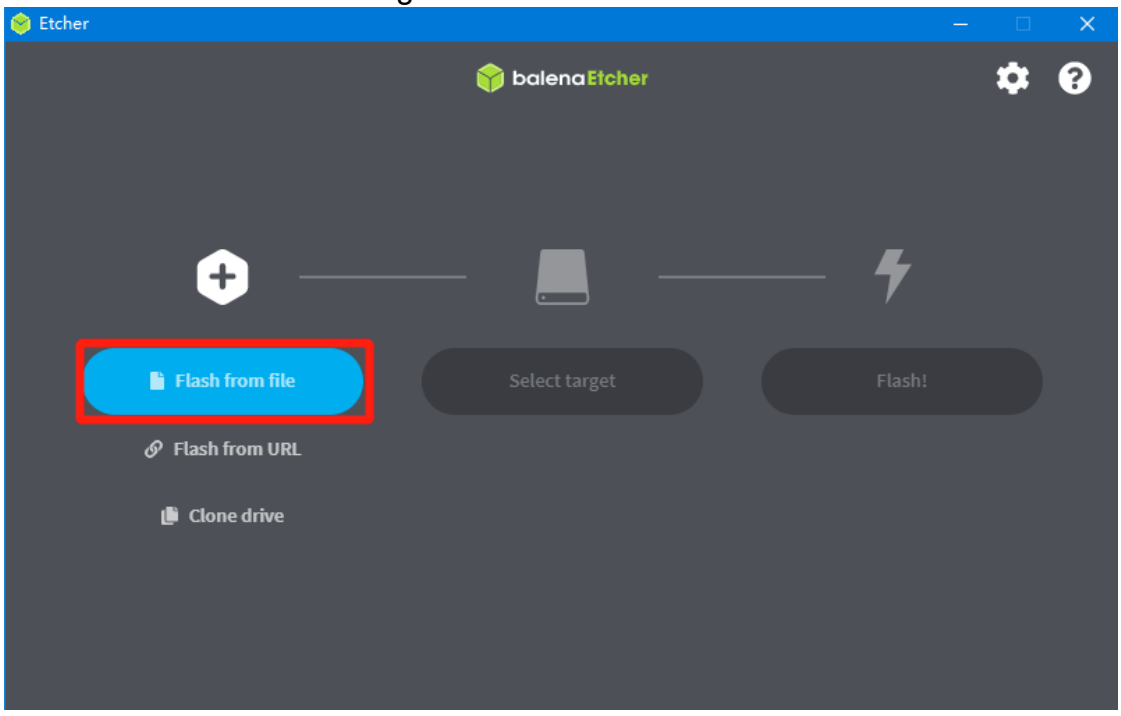
When using CB1, please download and install the OS image provided by BIGTREETECH.
https://github.com/bigtreetech/CB1/releases

Download and Install balenaEtcher

balenaEtcher: https://www.balena.io/etcher/

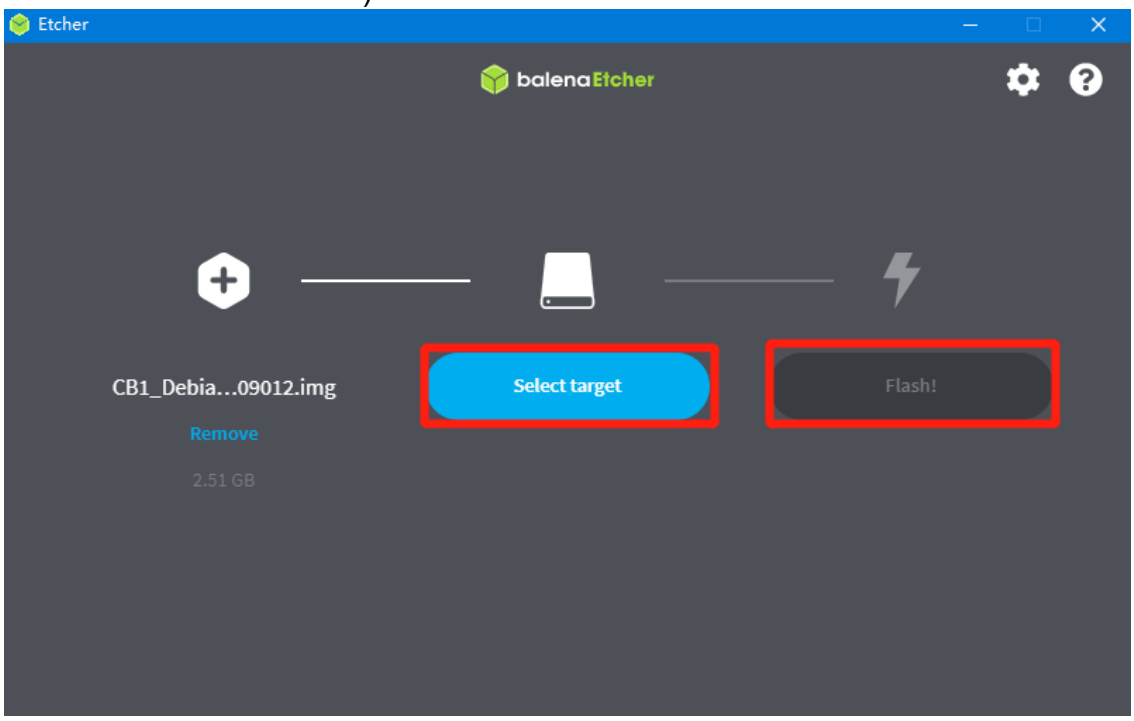
Write OS

1. Insert a microSD card into your computer via a card reader.
2. Select the downloaded image.

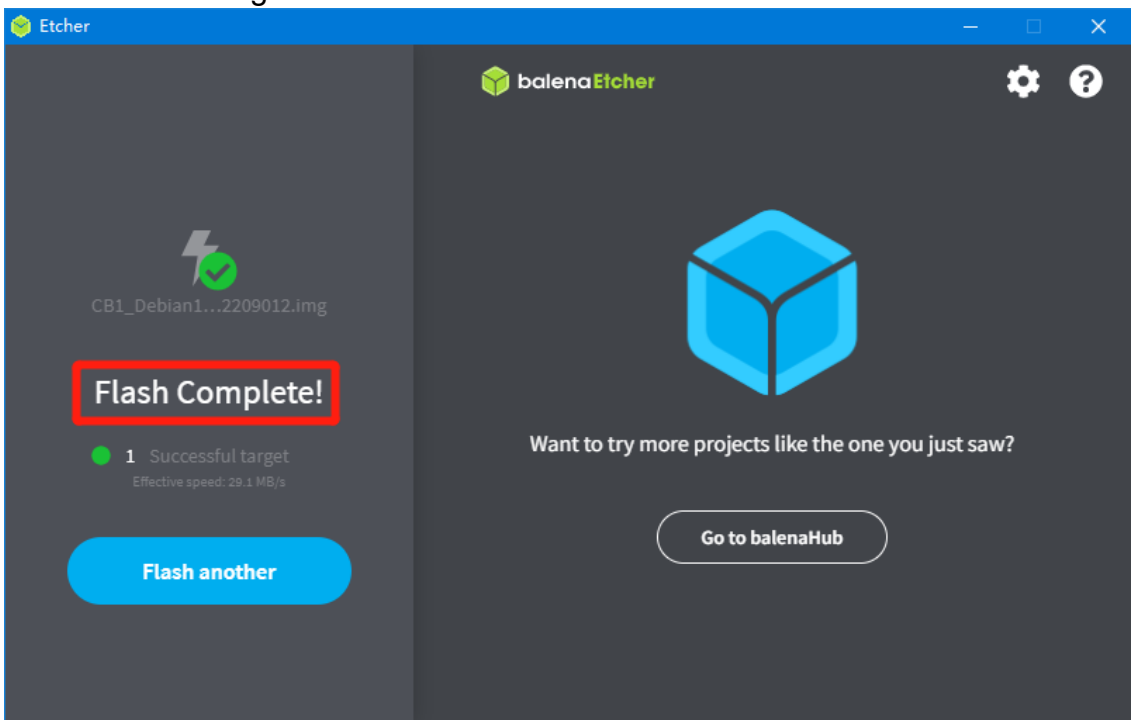


3. Select the microSD card and click "WRITE" (WRITE the image will format the MicroSD card. Be careful not to select the wrong storage device, otherwise

the data will be formatted).



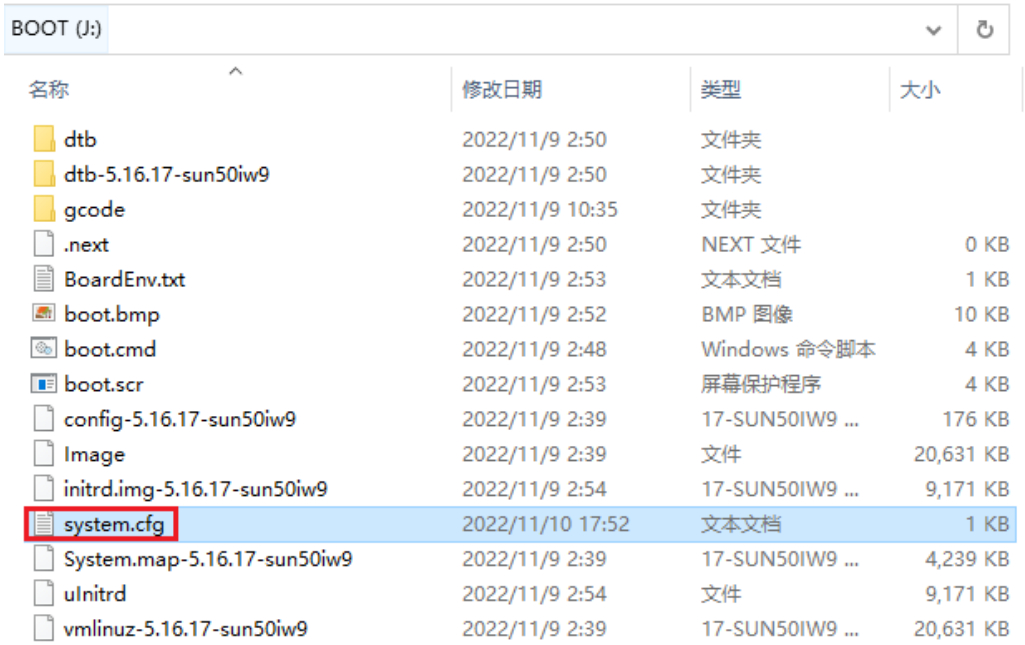
4. Wait for the writing to finish.



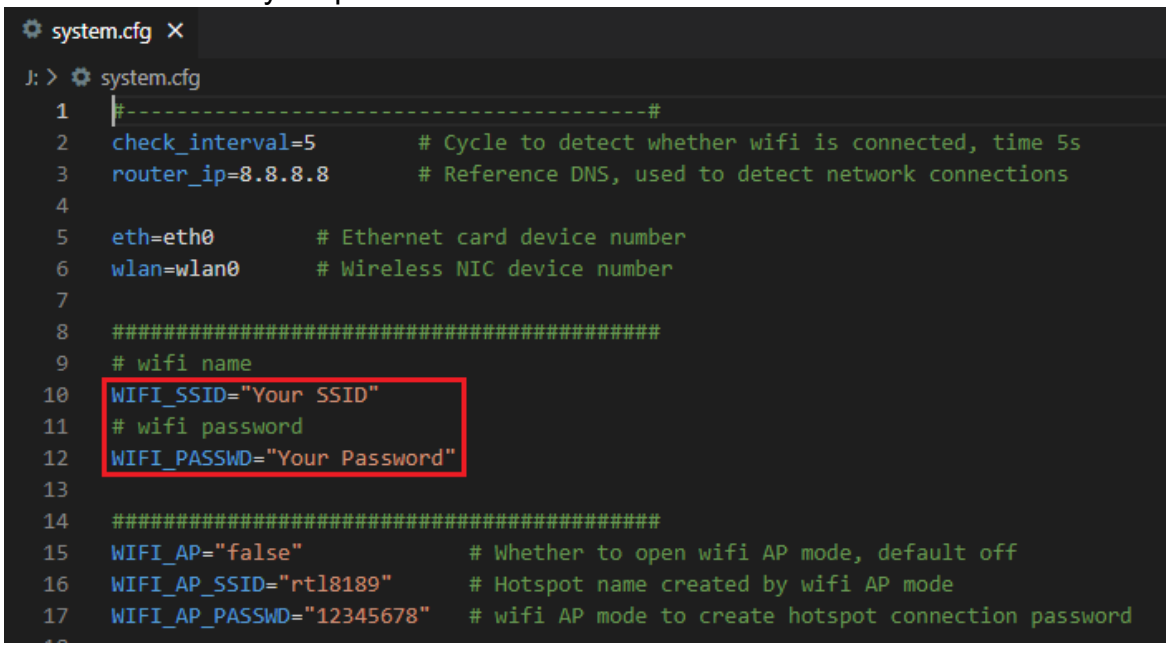
WiFi Setting

Note: Skip this step if you are using Ethernet port not using WiFi

After the OS image writing is completed, the microSD card will have a FAT32 recognized by the computer, find "system.cfg".



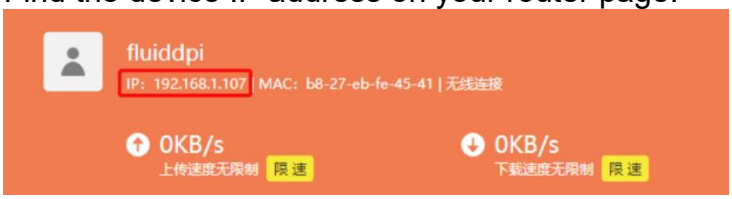
Open it with Notepad, replace WIFI-SSID with your WiFi name, and PASSWORD with your password.



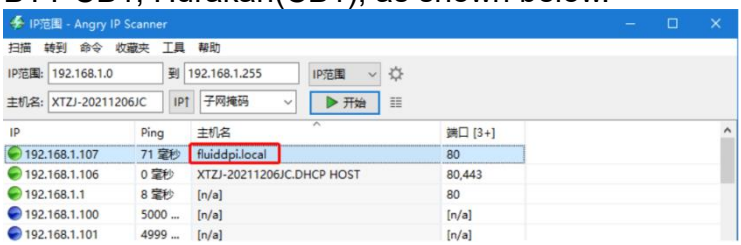
Configure the Motherboard

SSH Connect to Device

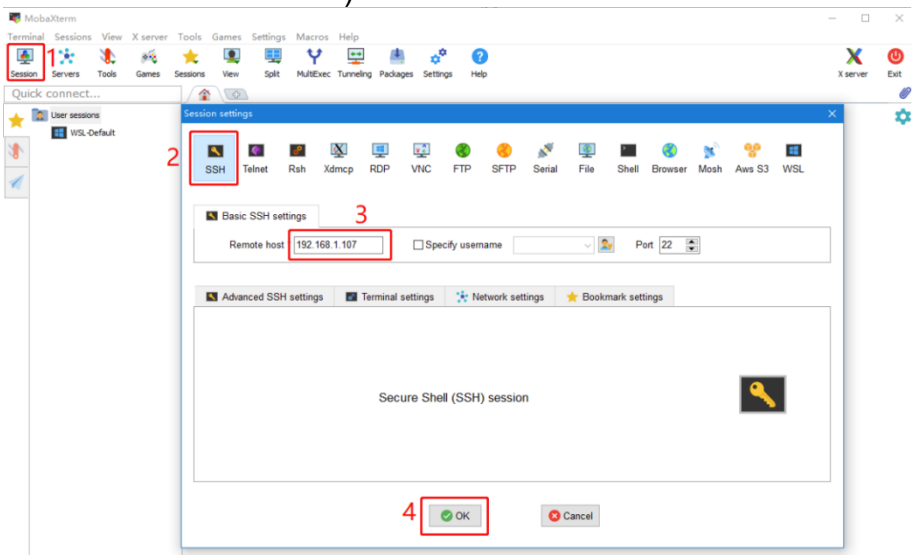
1. Install the SSH application Mobaxterm: https://mobaxterm.mobatek.net/download-home-edition.html
2. Insert micorSD card to SKRat, wait for system to load after power on, approx. 1-2min.
3. The device will automatically be assigned an IP address after being successfully connected to the network.
4. Find the device IP address on your router page.



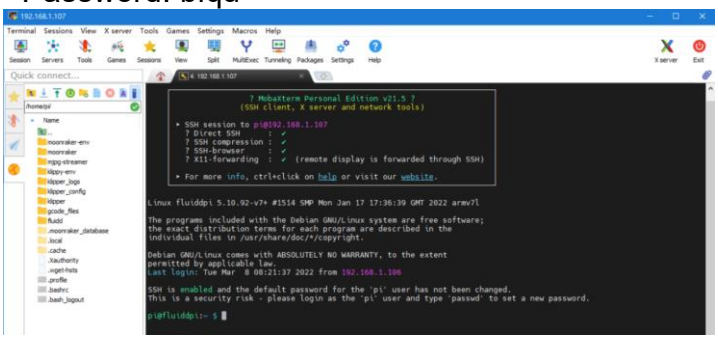
5. Or use the tool https://angryip.org/, scan all IP addresses in the current network organize by names, and find the IP named Fluidd, Mailsail(CM4), or BTT-CB1, Hurakan(CB1), as shown below.



6. Open Mobaxterm and click "Session", and click "SSH", inset the device IP into Remote host and click "OK" (note: your computer and the device need to be in the same network.)

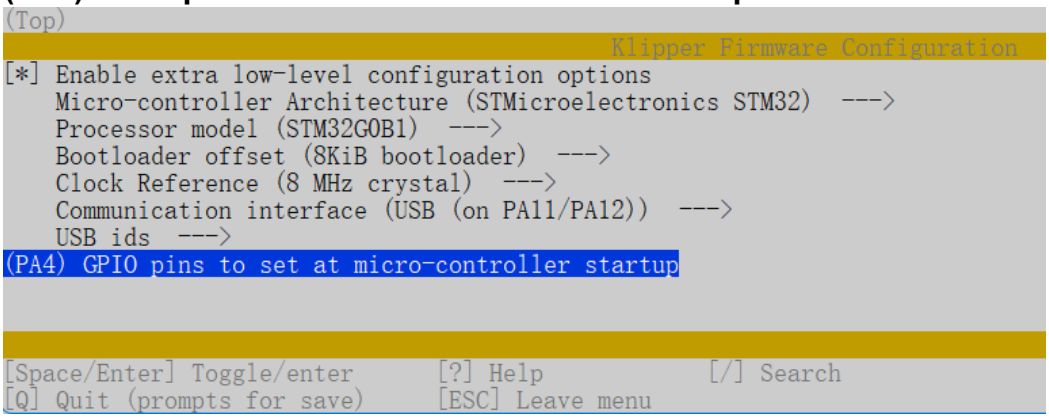


7. Login:
   CM4:
   Login as: pi
   Password: raspberry
   CB1:
   Login as: biqu
   Password: biqu



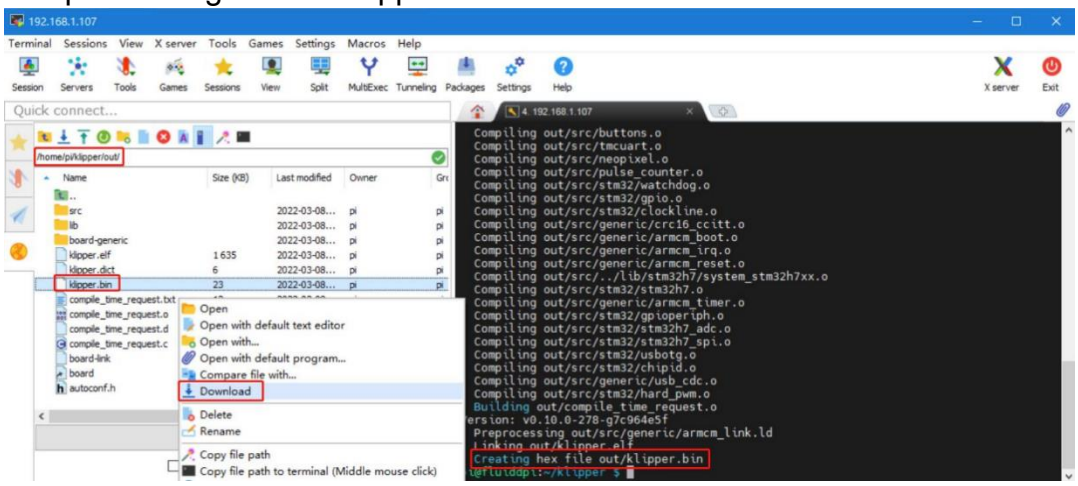
Compile MCU Firmware

1. After SSH is successfully connected to the device, enter in terminal:
   cd ~/klipper/
   make menuconfig
   Compile with the configuration shown below (if the options below are not available, please update your Klipper source code to the newest version)
   *** [*] Enable extra low-level configuration options**
   *** Micro-controller Architecture (STMicroelectronics STM32) --->**
   *** Processor model (STM32G0B1) --->**
   *** Bootloader offset (8KiB bootloader) --->**
   *** Clock Reference (8 MHz crystal) --->**
   When communicating via USB
   *** Communication interface (USB (on PA11/PA12)) --->**
   When communicating via CAN bus
   *** Communication interface (CAN bus (on PD0/PD1)) --->**
   (PA4) GPIO pins to set at micro-controller startup



2. Press ‘q’ to exit, and “Yes” when asked to save the configuration.

3. Run make to compile firmware, "klipper.bin" file will be generated in the home/pi/klipper/out folder when make is finished, download it onto your computer using the SSH application.



Firmware Update

Using microSD Card

1. Rename klipper.bin to "firmware.bin", copy it to the root directory of the microSD card, insert the microSD card into the card slot of the board, click the reset button, or power on again, the firmware will be updated automatically, after the update is complete, "firmware.bin" in the microSD card will be renamed to "FIRMWARE.CUR".

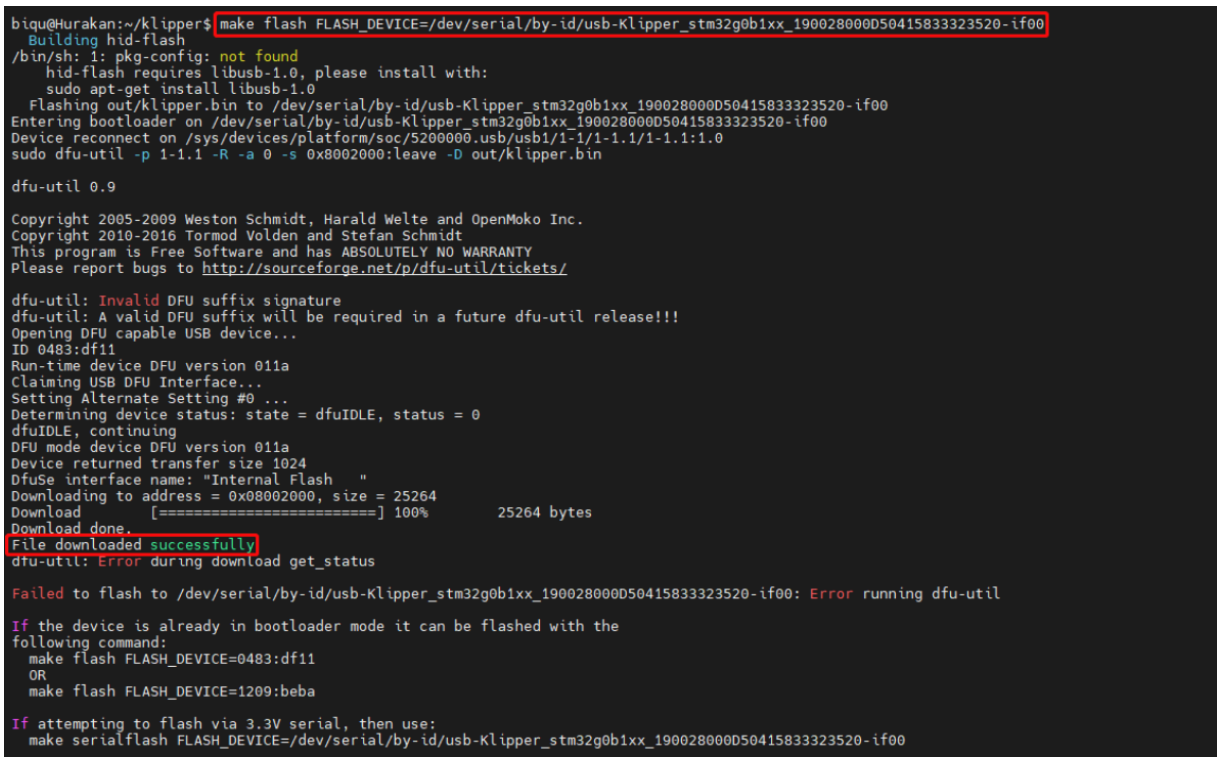
2. Enter **ls /dev/serial/by-id/** in the command line to check the motherboard ID to confirm whether the firmware is updated successfully as shown below.

```
pi@fluiddpi:~/klipper $ ls /dev/serial/by-id/
usb-Klipper_stm32g0b1xx_190028000D50415833323520-if00
pi@fluiddpi:~/klipper $
```

copy and save this ID, it is needed when configuring the file.

Via DFU

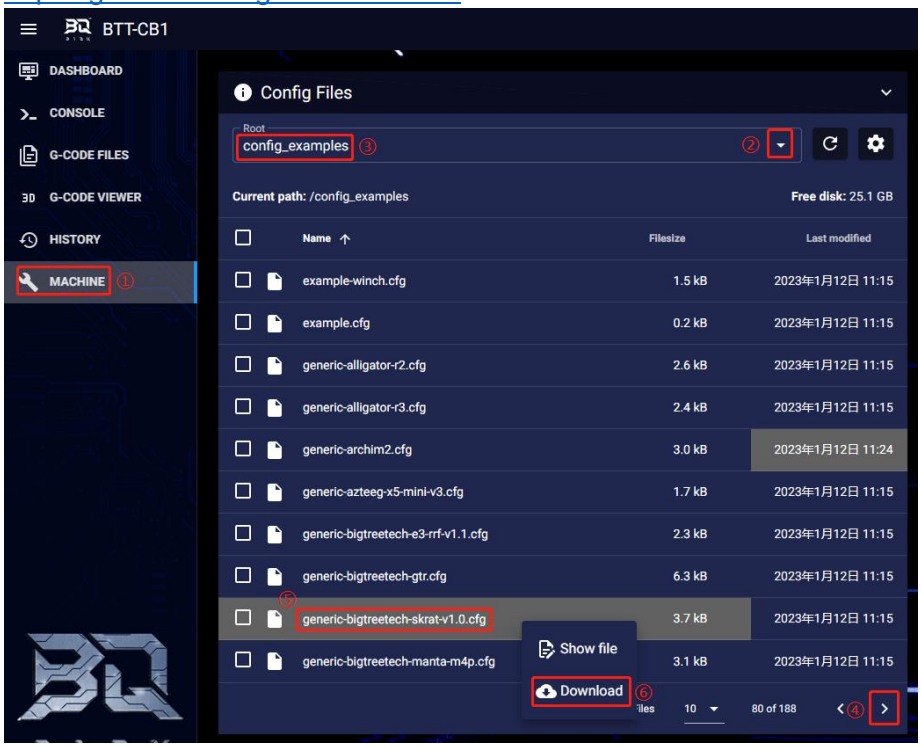
If **ls /dev/serial/by-id/** can find the klipper device ID of the MCU, you can enter make flash FLASH_DEVICE=/dev/serial/by-id/usb-Klipper_stm32g0b1xx_190028000D50415833323520-if00 directly to write the firmware. (Note: replace /dev/serial/by-id/xxx with the actual ID queried in the previous step.)



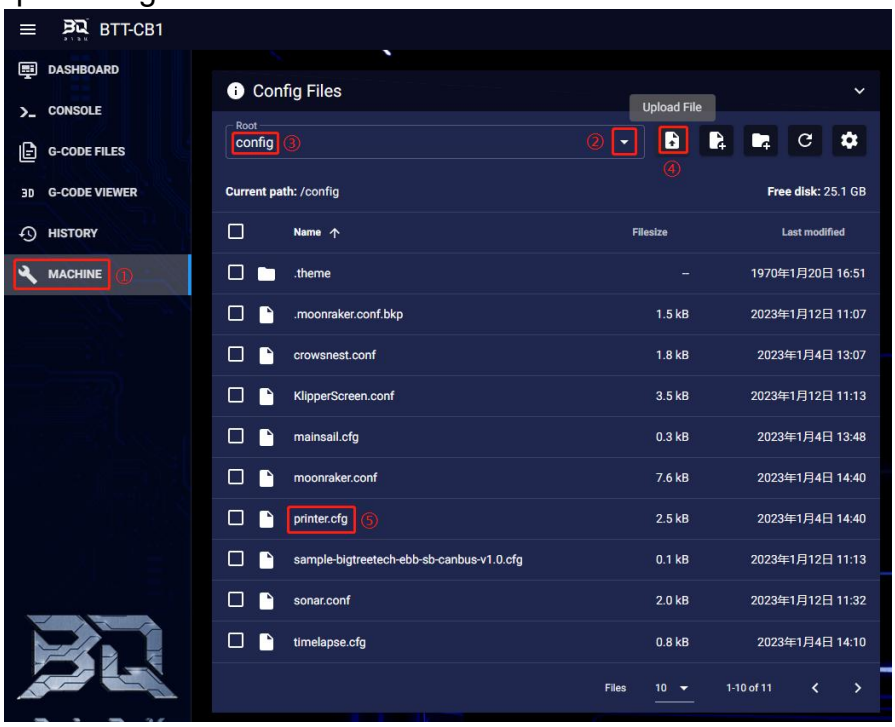
After the writing is completed, there will be an error message: dfu-util: Error during download get_status, just ignore it.

Configure Klipper

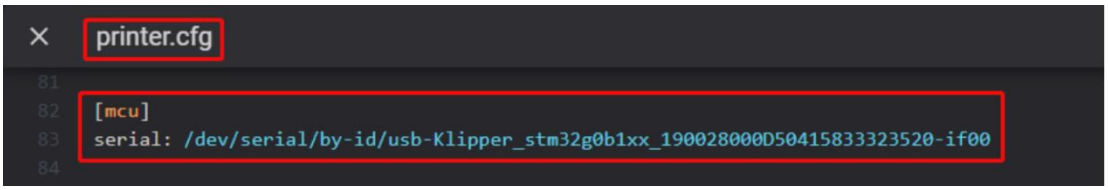
1. Enter your device IP address into your browser, and find the reference config for the motherboard in the directory shown below, if there is no such config available, update your Klipper source code to the newest version or download it from GitHub: https://github.com/bigtreetech/SKRat



2. Upload your finished config file into Configuration Files, and rename it to "printer.cfg".



3. Enter the correct motherboard ID



Refer to https://www.klipper3d.org/Overview.html for detailed configuration guide according to your machine type.

Firmware Update

Update via microSD Card

1. Make sure the microSD card is formatted to FAT32.

2. Rename your firmware file to "firmware.bin" (note: make sure your system is showing file suffix, if the suffix is hided, "firmware.bin" will be shown as"firmware").

3. Copy "firmware.bin" to the root directory of your microSD card.

4. Insert microSD card to the motherboard and power on, the bootloader will automatically update the firmware.

5. The status indicator light will flash during the update process.

6. When the status indicator light stops flashing and the firmware.bin file has been renamed to firmware.cur, that is to say, the firmware has been successfully updated.

Cautions

1. Max. heated bed current is 10A, if high power heated bed is preferred, please use 24V to power the system and use a 24V heated bed.
2. To ensure proper operation of the CNC fan port, insert the voltage selection jumper.
3. The microSD card slot is not spring loaded, please be careful when inserting the microSD card to prevent damage to the card slot. BTT is not responsible for any damage caused by forcefully inserting the microSD card.

FAQ

Q: Max. current of the heated bed, heater cartridge, fan port?

A: Heated Bed: 10A Continuous, 15A Instantaneous
Heater Cartridge: 8A Continuous, 10A Instantaneous
Fan Port: 1A Continuous, 1.5A Instantaneous

The combined current of the driver, heater cartridge and fan port should not exceed 15A.

Q: Can not update the firmware with microSD card?

A: Make sure your microSD card has been formatted to FAT32, and the firmware file name is "firmware.bin", make sure your system is showing a file suffix, if the suffix is hided, "firmware.bin" will be shown as "firmware".